FINAL

BASELINE HUMAN HEALTH RISK ASSESSMENT
FOR THE
GULFCO MARINE MAINTENANCE
SUPERFUND SITE
FREEPORT, TEXAS

PREPARED BY:

Pastor, Behling & Wheeler, LLC
2201 Double Creek Drive Suite 4004
Round Rock, Texas 78664
(512) 671-3434

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LIST OF ACRONYMS

AAF – absorption adjustment factor

ADD – average daily dose

AF – soil/sediment to skin adherence factor

$^{Air}Soil_{Inh\text{-}VP}$ – soil concentration that is protective of the air inhalation pathway

AST – aboveground storage tank

AT – averaging time

ATSDR – Agency for Toxic Substances and Disease Registry

BHHRA – Baseline Human Health Risk Assessment

BW – body weight (kg)

COC – chemical of concern

COI – chemicals of interest

CSF – cancer slope factor

CSM – conceptual site model

4,4'-DDD – dichlorodiphenyldichloroethylene

4,4'-DDT – dichlorodiphenyltrichloroethane

DQO – data quality objective

EA – exposure assessment

ED – exposure duration

EF – exposure frequency

EPA – United States Environmental Protection Agency

EPC – exposure point concentration

FI – fraction ingested

FSP – Field Sampling Plan

Ft. – feet

GRG – Gulfco Remediation Group

HI - hazard index

HQ – hazard quotient

IR – ingestion rate

IRIS – Integrated Risk Information System

IUR – inhalation unit risk

J&E VIM – Johnson & Ettinger Vapor Intrusion Model

KM – Kaplan-Meier

LIST OF ACRONYMS

LADD – lifetime average daily dose

MDL – method detection limit

NEDR – Nature and Extent Data Report

NOAEL – no observable adverse effects level

NPL – National Priorities List

OSWER – Office of Solid Waste and Emergency Response

PBW – Pastor, Behling & Wheeler, LLC

PCB – polychlorinated biphenyl

PCL – Protective Concentration Limit

PCOC – potential chemical of concern

PPRTV – Provisional Peer Reviewed Toxicity Values

PSA – potential source area

PSV – preliminary screening value

QA – quality assurance

QAPP – Quality Assurance Project Plan

QC – quality control

RfC – reference concentration

RfD – reference dose

RI – Remedial Investigation

RI/FS – Remedial Investigation/Feasibility Study

RME – reasonable maximum exposure

RSL – Regional Screening Level

SA – skin surface area

SOW – Statement of Work

^{SW}RBEL – risk-based exposure limit for surface water

TCEQ – Texas Commission on Environmental Quality

TDS – total dissolved solids

TDSHS – Texas Department of State Health Services

TRRP – Texas Risk Reduction Program

TSWQS – Texas Surface Water Quality Standard

UAO – Unilateral Administrative Order

UCL – upper confidence limit

VOC – volatile organic compound

EXECUTIVE SUMMARY

The purpose and scope of this document is to summarize the analytical data for environmental media sampled during the Remedial Investigation (RI) and to conduct a baseline human health risk assessment (BHHRA) based on those data for the Gulfco Marine Maintenance Superfund Site located at 906 Marlin Avenue in Freeport, Texas in Brazoria County (the Site). A BHHRA is the systematic, scientific characterization of potential adverse effects resulting from exposures to hazardous agents or situations. The results of the BHHRA are used to support risk management decisions and determine if remediation or further action is warranted at a site.

The Site consists of approximately 40 acres within the 100-year coastal floodplain along the north bank of the Intracoastal Waterway between Oyster Creek to the east and the Old Brazos River Channel to the west. Beginning in approximately 1971, barges were brought to the facility and cleaned of waste oils, caustics and organic chemicals, with these products reportedly stored in on-site tanks and later sold. Sandblasting and other barge repair/refurbishing activities also reportedly occurred on the Site. During the operation, wash waters were reportedly stored either on a floating barge, in on-site storage tanks, and/or in surface impoundments present on Lot 56 of the Site. The surface impoundments were closed under the Texas Water Commission's direction in 1982.

The area of the Site south of Marlin Avenue (South Area) includes approximately 20 acres of upland that were created from dredged material from the Intracoastal Waterway. Prior to construction of the Intracoastal Waterway, this area was most likely coastal wetlands. The area of the Site north of Marlin Avenue (North Area), excluding the capped surface impoundments and access roads, is considered estuarine wetland. The North Area consists of approximately five acres of upland, which supports a variety of herbaceous vegetation that is tolerant of drier soil conditions, while the North Area wetlands are approximately 15 acres in size.

Data related to the nature and extent of potential contamination in environmental media (e.g., soil, sediment, groundwater and surface water) at the Site were obtained as part of the RI. Unless otherwise noted, the samples were analyzed for the full suite of analytes as specified in the approved Remedial Investigation/Feasibility Study (RI/FS) Work Plan for the Site. Samples included:

- Eighty-three surface soil samples (0 to 0.5 ft below ground surface) and 83 subsurface soil samples (0.5 ft to 4 ft below ground surface) were collected in the South Area.
- Eighteen surface soil and subsurface soil samples were collected in the North Area.

- Two additional surface soil samples were collected near the former transformer shed at the South Area for polychlorinated biphenyls (PCBs) analyses only.
- Ten background soil samples were collected within the approved background area approximately 2,000 feet east of the Site near the east end of Marlin Avenue.
- Thirteen groundwater samples were collected from the shallow Zone A groundwater from the South Area and sixteen groundwater samples were collected from the shallow Zone A groundwater from the North Area.
- Sixteen sediment samples were collected from the Intracoastal Waterway in front of the Site. One additional sediment sample was collected near the Site and analyzed for 4,4'-DDT.
- Nine background sediment samples were collected from the Intracoastal Waterway east of the Site and across the main waterway canal.
- Forty-eight sediment samples were collected in the North Area wetlands. Additional sediment samples were collected from the North Area wetlands and analyzed for 4,4'-DDT; five of these samples were also analyzed for zinc.
- Eight sediment samples were collected from the two ponds located in the North Area.
- Four surface water samples were collected in the Intracoastal Waterway adjacent to the Site.
- Four surface water samples were collected from the background surface water area.
- Four surface water samples were collected in the North Area wetlands.
- Six surface water samples were collected from the two ponds located in the North Area.

All data were compared to appropriate human health screening levels (multiplied by a factor of 0.1 to ensure adequate protection) to identify the potential chemicals of concern (PCOCs) that were quantitatively evaluated further in the BHHRA. The exposure assessment was developed using information about current land, surface water, and groundwater uses to identify reasonably anticipated current and future receptors. For each receptor, potential exposure pathways were identified and considered fate and transport of the chemicals in the environment, point of contact with the exposure media, and possible routes of intake.

Based on the exposure assessment, it was assumed that potentially exposed populations for the South Area included: 1) future commercial/industrial workers; 2) future construction workers; and 3) a youth trespasser. Potentially exposed populations for the North Area were assumed to be the same. A contact recreation scenario was assessed for the sediment and surface water at both areas to represent the hypothetical person who occasionally contacts these media while swimming wading, or participating in other recreational activities. Potential impacts from fugitive dust generation and volatile compound emissions from South and North Area soils, and subsequent exposure to nearby residents was also evaluated. A previous report submitted to and approved by EPA evaluated the potential risks to recreational anglers via the consumption of fish from the Intracoastal Waterway. The findings of that evaluation are also included in the BHHRA.

Chemical exposure was quantified by estimating a daily dose or intake for each pathway given standard exposure assumptions using average and a reasonable maximum exposure concentration, which was generally represented by a 95th percent upper confidence limit on the mean. Toxicity values for the chemicals of concern were obtained from standard resources such as EPA's on-line database -- Integrated Risk Information System (IRIS).

Risk characterization is the integration of the exposure estimate (or dose) and the toxicity information to make quantitative estimates and/or qualitative statements regarding potential risk to human health. The risk assessment concluded that, for the five different exposure scenarios that were quantitatively evaluated, the cancer risk estimates and noncancer hazard indices for all of the current or future exposure scenarios were within EPA's acceptable risk range or below the target hazard index of 1with the exception of potential risks associated with future exposure to an indoor industrial worker if a building is constructed over the area of impacted groundwater in the North Area. It is recommended that the potential future exposure to workers in an enclosed space (if a building were constructed above the groundwater plume in the North Area) from vapors possibly emanating from groundwater and migrating to the indoor air be prevented. No further action or investigation is necessary for the other media at the Site since adverse risks are not expected to result from potential current or future exposure at the Site.

1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA) named the former site of Gulfco Marine Maintenance, Inc. (the Site) in Freeport, Brazoria County, Texas to the National Priorities List (NPL) in May 2003. The EPA issued a modified Unilateral Administrative Order (UAO), effective July 29, 2005, which was subsequently amended effective January 31, 2008. The UAO required the Respondents to conduct a RI/FS for the Site. The Statement of Work (SOW) for the RI/FS at the Site, provided as an Attachment to the UAO from the EPA, requires the performance of a BHHRA to "evaluate and assess the risk to human health posed by the contaminants present at the Site." As specified in Paragraph 37a of the SOW, BHHRA activities include the submittal of Draft and Final Potential Chemicals of Concern Memoranda and Draft and Final Exposure Assessment (EA) Memoranda, ending with a Draft and Final BHHRA. In order to expedite completion of the RI/FS through submittal of a single BHHRA deliverable, the interim BHHRA deliverables (i.e., the PCOC and EA Memoranda) have been incorporated in this BHHRA.

Pursuant to Paragraphs 17 through 28 of the SOW, an RI/FS Work Plan and a Sampling and Analysis Plan were prepared for the Site. These documents were approved with modifications by EPA on May 4, 2006 and were finalized on May 16, 2006. This BHHRA has been prepared in accordance with Section 5.7.1 of the approved RI/FS Work Plan (the Work Plan) (PBW, 2006a). The BHHRA was prepared by Pastor, Behling & Wheeler, LLC (PBW), on behalf of LDL Coastal Limited LP (LDL), Chromalloy American Corporation (Chromalloy), and The Dow Chemical Company (Dow), collectively, the Gulfco Restoration Group (GRG).

A BHHRA is the systematic, scientific characterization of potential adverse effects resulting from exposures to hazardous agents or situations (NRC, 1983). The results of the BHHRA are used to support risk management decisions and determine if remediation or further action is warranted at a site.

The RI/FS is the methodology that the Superfund program has established for characterizing the nature and extent of risks posed by uncontrolled hazardous wastes sites and for developing and evaluating remedial options. The risk assessment methodology is based on approaches described by the EPA in *Risk Assessment Guidance for Superfund (RAGS), Volume 1, Human Health Evaluation Manual, Part A* (EPA, 1989) and various supplemental and associated guidance (e.g., EPA, 1986; 1991a and b; 1992a and b; 1997a; 1999; 2001; 2002a, and b; 2004a and b; 2008; and 2009). The BHHRA generally consists of the following components:

- Review of analytical data and identification of potential chemicals of concern or PCOCs;
- Exposure assessment, including identification of potentially exposed populations, exposure pathways, and chemical intakes;
- Human health toxicity assessment;
- Risk characterization; and
- Uncertainty analysis.

The Nature and Extent Data Report (NEDR) (PBW, 2009) describes the history and background of the Site, and the environmental investigations conducted during the various phases of the RI. It also includes all of the analytical data generated during the RI and a discussion of the environmental conditions at the Site.

Section 2.0 of the BHHRA describes the process for evaluating the data and selecting PCOCs. Section 3.0 provides the exposure assessment. The toxicity assessment is contained in Section 4.0. Risks are characterized in Section 5.0. Section 6.0 describes uncertainties associated with the risk assessment process. Section 7.0 presents the conclusions of the risk assessment. Appendix A provides statistical calculations for the analytical data, by media; Appendix B provides the statistical comparisons between Site data and background data; Appendix C provides the intake calculations for the receptors evaluated herein; Appendix D provides the risk calculations; and Appendix E provides a copy of the restrictive covenants for the Site.

1.1 SITE LOCATION AND HISTORY

The Site is located northeast of Freeport, Texas in Brazoria County at 906 Marlin Avenue (also referred to as County Road 756). The Site consists of approximately 40 acres within the 100-year coastal floodplain along the north bank of the Intracoastal Waterway between Oyster Creek to the east and the Old Brazos River Channel to the west. Figure 1 provides a map of the Site vicinity; Plate 1 provides a detailed Site map and shows site features and sampling locations.

During the 1960s, the Site was used for occasional welding but there were no on-site structures (Losack, 2005). According to the Hazard Ranking Score Documentation (TNRCC, 2002), from 1971 through 1999, at least three different owners used the Site as a barge cleaning facility. Beginning in approximately 1971, barges were brought to the facility and cleaned of waste oils, caustics and organic chemicals, with these products reportedly stored in on-site tanks and later sold (TNRCC, 2002). Sandblasting and other barge repair/refurbishing activities also occurred on the Site. At times during the operation, wash waters were reportedly stored either on a floating barge, in on-site storage tanks, and/or in surface impoundments on Lot 56 of the Site. The surface impoundments were closed under the Texas Water Commission's (Texas Commission on Environmental Quality (TCEQ) predecessor agency) direction in 1982 (Carden, 1982).

Marlin Avenue divides the Site into two areas. For the purposes of this report, it is assumed that Marlin Avenue runs due west to east. The property to the north of Marlin Avenue (the North Area) consists of undeveloped land and the closed impoundments, while the property south of Marlin Avenue (the South Area) was developed for industrial uses with multiple structures, a dry dock, sand blasting areas, an aboveground storage tank (AST) tank farm that is situated on a concrete pad with a berm, and two barge slips connected to the Intracoastal Waterway.

The South Area is zoned as "W-3, Waterfront Heavy" by the City of Freeport. This designation provides for commercial and industrial land use, primarily port, harbor, or marine-related activities. The North Area is zoned as "M-2, Heavy Manufacturing." Restrictive covenants prohibiting any land use other than commercial/industrial and prohibiting groundwater use have been filed for all parcels within both the North and South Areas. Additional restrictions requiring any building design to preclude vapor intrusion have been filed for Lots 55, 56, and 57. A further restriction requiring EPA and TCEQ notification prior to any building construction has also been filed for Lot 55, 56, and 57. Copies of these covenants, including parcel maps with the specific Lot identified, are provided in Appendix E.

Adjacent property to the north, west and east of North Area is unused and undeveloped, and/or is designated as wetlands as shown in Figure 2. Adjacent property to the east of the South Area is currently used for industrial purposes while the property directly to the west of the Site is currently vacant and previously served as a commercial marina. The Intracoastal Waterway bounds the Site to the south. Residential areas are located south of Marlin Avenue, approximately 300 feet west of the Site, and 1,000 feet east of the Site.

1.2 ENVIRONMENTAL SETTING

The Site is located between Galveston and Matagorda Bays and is situated along approximately 1200 feet (ft.) of shoreline on the Intracoastal Waterway. The Intracoastal Waterway is a coastal shipping canal that extends from Port Isabel to West Orange on the Texas Gulf Coast and is a vital corridor for the shipment of bulk materials and chemicals. It is the third busiest shipping canal in the United States, and along the Texas coast carries an average of 60 to 90 million tons of cargo each year (TxDOT, 2001). Of the cargo carried between Galveston and Corpus Christi, TX, 49 percent is comprised of petroleum and petroleum products and 38 percent is comprised of chemicals and related products. Approximately 50,000 trips were made by vessels making the passage through the Intracoastal Waterway between Galveston and Corpus Christi, TX in 2006 (USACE, 2006).

The South Area includes approximately 20 acres of upland that were created from dredged material from the Intracoastal Waterway. Prior to construction of the Intracoastal Waterway, this area was most likely coastal wetlands. The North Area, excluding the capped impoundments, the uplands area, and access roads, is considered estuarine wetland (USFWS, 2008), as shown in Figure 2. The North Area consists of approximately five acres of upland, which supports a variety of herbaceous vegetation that is tolerant of drier soil conditions, while the North Area wetlands are approximately 15 acres in size. The wetlands at the Site are typical of irregularly flooded tidal marshes of the Texas Gulf Coast and supports wildlife that would be common in the Texas coastal marsh.

There are two ponds on the North Area, located east of the former surface impoundments (Plate 1). The larger of the two ponds is called the Fresh Water Pond while the other pond is referred to as the Small Pond. It should be noted, however, that based on field measurements of salinity, the water in the Fresh Water Pond is brackish while water in the Small Pond is less brackish (but is not fresh water). The Fresh Water Pond is believed to be a borrow pit and the water depth is generally 4 to 4.5 feet. The Small Pond is a shallow depression that tends to dry out during summer months and periods of drought. The water depth in the Small Pond was approximately 0.2 feet when sampled in July 2006 and nearly dry when sampled in June 2008.

The Intracoastal Waterway supports barge traffic and other boating activities. Fishermen have occasionally been observed on and near the Site in the Intracoastal Waterway. Red drum (*Sciaenops ocellatus*), black drum (*Pogonias cromis*), spotted seatrout (*Cynoscion nebulosus*), southern flounder (*Paralichthys lethostigma*) and other species are reportedly caught in the Freeport Area (TPWD, 2009). It should be noted that, during the fish sampling conducted for the human health fish ingestion pathway risk assessment, red drum were not caught (using nets) as frequently as other species (see discussion in NEDR (PBW, 2009)), presumably because of a lack of habitat and prey items near the Site. Recreational and commercial fishermen reportedly collect blue crabs (*Callinectes sapidus*) from waterways in the region. The Texas Department of State Health Services (TDSHS) has banned the collection of oysters from this area due to biological hazards and has issued a consumption advisory for king mackerel for the entire Gulf Coast due to mercury levels in the fish (TDSHS, 2005).

2.0 DATA EVALUATION AND IDENTIFICATION OF POTENTIAL CHEMICALS OF CONCERN

This section describes the general data evaluation procedures that were used to ensure that data included in the risk assessment are of sufficient quality for quantitative risk assessment, as per EPA (1992a) guidance. This section also presents the methods that were followed to identify PCOCs for applicable exposure media in the BHHRA. Data collected as part of the RI were collected to support three objectives: nature and extent evaluation, risk assessment, and evaluation of potential remedial alternatives. The NEDR (PBW, 2009) discusses data collected to define the nature and extent of contamination at the Site and may contain data that are not of concern from a human health exposure perspective (e.g., Zone B and Zone C groundwater due to high total dissolved solids concentration and restrictive covenants precluding Site groundwater use (Appendix E)).

For the purposes of this risk assessment, a chemical of interest (COI) is defined as any compound detected in at least one environmental sample. A PCOC is any compound that does not get eliminated from further consideration based on frequency of detection, evaluation with blank contamination or background concentrations, and a concentration-toxicity screen, described in this section. PCOCs are quantitatively evaluated in the risk assessment. A chemical of concern (COC) is a compound that is determined as part of the risk assessment to present a potential adverse human health risk and will be evaluated further in the Feasibility Study, if necessary.

Data related to the nature and extent of potential contamination at the Site were obtained as part of the RI and, as noted previously, are discussed in the NEDR (PBW, 2009). Unless otherwise noted, the samples were analyzed for the full suite of analytes as specified in the approved Work Plan (PBW, 2006a). Plate 1 provides sample locations for site-related samples, and Figure 3 provides sample locations for the background soil, surface water, and sediment samples. Tables 1 through 15 summarize the key parameters for the COIs measured in these samples and provide maximum and minimum measured concentrations, as well as summary statistics for each COI for each media. Average and 95% upper confidence limits (95% UCLs) on the mean were estimated using EPA guidance (EPA, 2002b) and are presented in the tables as well. The method for estimating the average and 95% UCLs is described in greater detail in the Section 3.4.

Eighty-three surface soil samples (0 to 0.5 ft below ground surface (bgs)) and 83 subsurface soil samples (0.5 ft to 4 ft bgs) were collected in the South Area (summarized in Tables 1 and 2). Eighteen surface soil samples and 18 subsurface soil samples were collected in the North Area (summarized in Tables 8 and 9).

Two additional surface soil samples were collected near the former transformer shed at the South Area for PCBs analyses only. Ten background soil samples were collected within the approved background area approximately 2,000 feet east of the Site near the east end of Marlin Avenue (summarized in Table 15; sample locations shown on Figure 3).

Thirteen groundwater samples were collected from Zone A in the South Area (summarized in Table 3) and sixteen groundwater samples were collected from Zone A in the North Area (summarized in Table 10). The groundwater investigation evaluated contamination in deeper zones, Zones B and C. This information is discussed in the NEDR (PBW, 2009) but was not included in the BHHRA since it is unlikely that contaminants in deeper groundwater affect the media evaluated in the risk assessment based on high total dissolved solids (TDS) and the restrictive covenants on the property (Appendix E). While groundwater data from Zone A were used to evaluated the vapor intrusion pathway, data from Zones B and C were not used in this evaluation since they underlie Zone A and are COIs measured in deeper groundwater would not be as likely to impact indoor air as COIs measured in the more shallow groundwater unit, Zone A.

Sixteen sediment samples were collected from the Intracoastal Waterway in front of the Site (summarized in Table 6). One additional sediment sample was collected from the Intracoastal Waterway near the Site and analyzed for 4,4'-DDT to further characterize the extent of contamination as described in the NEDR (PBW, 2009). Nine background sediment samples were collected from the Intracoastal Waterway east of the Site and across the canal (summarized in Table 7). Forty-eight sediment samples were collected in the North Area wetlands (summarized in Table 13). Seven additional sediment samples were collected from the North Area wetlands and analyzed for 4,4'-DDT; five of these samples were also analyzed for zinc. A total of eight sediment samples were collected from the two ponds located in the North Area (summarized in Table 14).

Four surface water samples were collected in the Intracoastal Waterway adjacent to the Site (summarized in Table 4). Four surface water samples were collected from the background surface water area, located in the Intracoastal Waterway east of the Site, and across the canal (summarized in Table 5; sampling locations shown on Figure 3). Four surface water samples were collected in the wetlands drainage areas north of Marlin Avenue (summarized in Table 11) and a total of six surface water samples were collected from the two ponds located in the North Area (summarized in Table 12). Chemical analyses of these surface water samples included both total and dissolved concentrations of metals. For the purposes of the BHHRA, total concentrations were used since it is unlikely that samples would be filtered prior to incidental exposure as defined by the scenarios evaluated in this risk assessment.

2.1 DATA EVALUATION

The Quality Assurance Project Plan (QAPP) (PBW, 2006c) and Field Sampling Plan (FSP) (PBW, 2006b), which were developed concurrently with the RI/FS Work Plan (PBW, 2006a), were designed to ensure that the data collected during the RI are appropriate for quantitative risk assessment. After RI data collection, the existing data and RI data were subject to a data evaluation following procedures recommended by EPA (1992a) to ensure that these data are of adequate quality for quantitative risk assessment and to support risk management decisions. These include consideration of the following factors: data sources, completeness of documentation, adequacy of detection limits, and “data quality indicators” as defined by the EPA (1992a) guidance. The data quality indicators include: 1) sampling completeness; 2) representativeness of sampling locations for relevant exposure areas; 3) usability indicated by data validation results (including considerations of laboratory precision and accuracy); and 4) comparability of data analyzed by different methods. Data representativeness is one of the most important criteria when selecting data for use in the quantitative risk assessment. Representativeness is the extent to which data characterize potential exposure and hence risks to human health and the environment. Data selected for use in the quantitative risk assessment should be of overall high quality, and data validation should confirm that the data collected during the RI are of adequate quality for risk assessment.

Data validation was performed following the procedures set forth in the RI/FS Work Plan (PBW, 2006a) and the QAPP (PBW, 2006c). Results of the data evaluation and validation for the BHHRA data set are summarized as follows:

- Data Sources – All BHHRA data were generated using rigorous analytical methods (i.e., EPA-approved methods) by a single analytical laboratory with a documented quality system (i.e., accredited under the National Environmental Laboratory Accreditation Program). Historical data was not used for the BHHRA.

- Completeness of Documentation – Field sampling activities were documented on field data sheets. Sample custody was documented to maintain security and show control during transfer of samples. Analytical results were reported in laboratory data packages containing all information necessary for the data validation.

- Adequacy of Detection Limits – The QAPP specifies target Method Detection Limits (MDL), which were established based on the laboratory’s capabilities and are less than the human health

Preliminary Screening Value (PSV), where possible, based on the standard available method with the lowest possible MDL. The MDL, as reported by the laboratory, for all constituents is at or below the target MDL or the human health PSV for the BHHRA data set except for 3,3'-dichlorobenzidine in the four Phase 2 surface water samples and benzidine in the seventeen Phase 2 sediment samples, one Phase 3 sediment sample, and four Pahse 4 sediment samples. (For Phase 1, the sample detection limits, or SDLs, are below the target MDLs for both of these constituents. Benzidine was not detected in any sample from the Site and 3,3'-dichlorobenzidine was only detected in a one sediment sample from the Site.)

- Data Quality Indicators
    - Sampling Completeness – The percentage of environmental samples collected versus that planned is 100% for samples critical to the BHHRA and is greater than the QAPP goal of 90% for every media and test except chromium VI. Chromium VI analyses were not performed for most of the Phase 1 sediments and all of the Phase 1 soils. However, there is no effect on usability for the BHHRA data set since total chromium, which includes any chromium VI, is reported for all samples.
    - Representativeness of Sampling Locations – Phase 1 samples were collected in accordance with the sampling plan presented in the FSP (PBW, 2006b), which was designed to meet the Data Quality Objectives (DQOs) detailed in the QAPP (PBW, 2006c), and additional samples were collected as needed based on the results of the initial sampling event. All samples were properly located and collected using approved standard operating procedures. As described in the RI/FS Work Plan (PBW, 2006a), it was decided that the majority of the soil and sediment sampling would be conducted on a random grid basis with some focused sampling in areas of known historical use. This type of sampling program is appropriate for estimating risks since human health exposure generally occurs randomly over a site, or a portion of a site. Plate 1 shows locations of soil, surface water, sediment and groundwater samples.
    - Data Validation Results – All data were validated using an approved standard operating procedure (Appendix F in the QAPP) based on the EPA *National Functional Guidelines* for organics and inorganics, respectively (EPA, 1999 and 2002c). A Level III validation including all quality control (QC) checks such as spike recovery, duplicate precision, blanks, holding time, calibration, surrogates, and internal standards was completed for 100% of the samples. Additionally, a Level IV validation that included examination of the raw data was completed for 10% of the soil, sediment, and surface water samples as stipulated in the QAPP. If a QC deficiency was found, sample results were flagged as

- Comparability of Data – Data were generated using the same analytical method for each constituent except naphthalene. Naphthalene was analyzed using SW-846 Method 8260B for all samples but four groundwater samples, which were analyzed using SW-846 Method 8270C. Both methods are rigorous analytical methods performed by a fixed analytical laboratory with a documented quality system meeting stringent QC requirements (unless qualified as rejected) and thus are comparable. All sample results are in standardized units of measure with dry-weight correction for soils and sediments.

As per EPA (1989 and 1992a), validated data qualified as J (estimated) and U (blank-affected) are included in the risk assessment. For quantitative purposes, when a compound was not detected or was blank-affected, one-half of the sample quantitation limit (as defined by the U.S. EPA (1992a)) was used as a proxy to provide a measurement for analysis. Only those data that were rejected (i.e., qualified as "R") were not included in the quantitative risk assessment. As indicated in the RI/FS Work Plan (PBW, 2006a), once the data collection, chemical analysis, and data evaluation/validation were complete, the data were analyzed to identify COIs for the human health risk assessment. The following section describes the process for determining whether a COI became a PCOC and was evaluated further in the BHHRA.

2.2 IDENTIFICATION OF POTENTIAL CHEMICALS OF CONCERN

EPA guidance (EPA, 1989) recommends considering several steps to eliminate compounds from further evaluation and, as such, this section describes the process used to reduce the list of chemicals evaluated in the BHHRA. Compounds were eliminated from further consideration if: 1) they were detected infrequently in a given media (i.e., in less than five percent of the samples); 2) they were measured at similar concentrations in blank samples; 3) they were detected at a low concentration (below one tenth of the screening value discussed below); or 4) they were measured at similar concentrations in background samples.

All analytes detected in at least one sample above the detection limit (including "J-flagged" data) were initially reviewed. If a compound was detected in less than five percent of the samples, the compound was eliminated from further evaluation for that media. This step was only considered in media where twenty or more samples were collected and if that compound was not present in another media. The lab did not report any blank contamination issues with the data so no compounds were eliminated based on this criterion.

The data for soil, groundwater, surface water, and sediment are summarized in Tables 1 through 15. These tables show the frequency of detection, minimum, maximum, and average concentration for each COI. The 95% UCL on the mean concentration was calculated as described in Section 3. Appendix A provides the statistical calculations for these data.

2.2.1 Concentration-Toxicity Screen

A "concentration-toxicity screen" step, as recommended by EPA (EPA, 1989), was conducted to limit the number of chemicals that were included in a quantitative risk assessment while also ensuring that all chemicals that might contribute significantly to the overall risk were addressed. The screening values used were 1/10th of the human health criteria, which were the lower of the EPA or TCEQ human health values as presented in the NEDR (PBW, 2009) for soil, surface water, and sediment. (It should be noted that NEDR tables also included ecological criteria and background values.) These screening criteria were compared to the maximum measured Site concentration and those compounds measured in Site samples in excess of the screening criteria (if any) have been denoted in bold on Tables 1, 2, 4, 6, 8, 9, 11, 12, 13, and 14. Because there are no readily available screening levels appropriate for the complete groundwater pathway at the Site, all chemicals of interest for groundwater media (Tables 3 and 10) were quantitatively evaluated in the risk assessment. It should be noted that if a compound was measured in more than five percent of the samples but a screening level was not available, it was retained for further evaluation in the BHHRA (eg., iron in sediment).

A similar screen was conducted for media collected at the background areas (Tables 5, 7, and 15), but this was done merely for comparative purposes. Risks associated with background concentrations were not calculated in the BHHRA.

In addition, PCOC concentrations in soil samples from the South Area and North Area were compared to TCEQ's Protective Concentration Levels (PCLs) that were developed to evaluate exposure to air emissions from particulate dust and volatile organic compounds (VOCs) emitted from contaminated soil (${}^{Air}Soil_{InhV\text{-}P}$) in order to assess potential impacts from air emissions to nearby off-site residents. This approach is conservative since diluting effects of off-site migration and dispersion were not considered.

Aroclor-1254 and naphthalene were detected in South Area soil at a concentration greater than $1/10^{th}$ of the screening criteria, as shown in Tables 16, while no COIs were measured in North Area soil at a concentration greater than $1/10^{th}$ of the screening criteria, as shown in Table 17. While two compounds were measured at a concentration greater than $1/10^{th}$ of the screening criteria, it is unlikely that there is a potentially unacceptable risk since no attenuation was assumed for migration and dispersion, and because neither the average nor 95% UCL for these compounds exceed the screening criteria. Since this pathway was the only exposure pathway for the off-Site resident and because the screening evaluation shows no likelihood of adverse risk, this potential receptor was eliminated from further evaluation in the BHHRA. It should be noted, however, that inhalation of particulate dust and VOCs in soil at the South Area and North Area was evaluated for the industrial worker, construction worker, and youth trespasser scenarios as discussed in Section 3.0.

Exposure and risk calculations were not estimated for the surface water pathway in the Intracoastal Waterway and Wetlands Area because none of the measured maximum COI concentrations exceeded $1/10^{th}$ of their respective TCEQ's contact recreation PCL. These PCLs were developed for a child exposure scenario for noncarcinogenic compounds, and an age-adjusted scenario for carcinogenic compounds. The PCL is based on incidental ingestion and dermal contact of surface water while swimming for three hours, 39 times per year. It is believed that this is a bounding estimate for the Intracoastal Waterway, surface water north of Marlin Ave., and the ponds north of Marlin Ave. since none of these surface water bodies are very favorable for swimming and true exposure is likely to be much less than the scenario described by the Texas Risk Reduction Program's (TRRP) contact recreation PCL. All surface water concentrations were well below $1/10^{th}$ of the PCL for the Intracoastal Waterway and wetlands area surface water. Maximum measured concentrations of arsenic and thallium in the pond samples exceeded $1/10^{th}$ of their respective PCL but did not exceed the PCL and, therefore, neither were retained for further evaluation. Although TCEQ does not provide a PCL for iron, one was calculated using the contact recreation assumptions (TCEQ, 2006). Measured concentrations of iron in surface water were well below the calculated contact recreation PCL of 2,800 mg/L. Therefore, it was concluded that chemical concentrations of COIs in surface water samples from the Intracoastal Waterway near the Site, surface water in the North Area wetlands, and surface water in the North Area ponds do not pose an unacceptable health risk and chemical concentrations in these media were not evaluated further in the BHHRA.

In a response to EPA comments on the Draft BHHRA (EPA, 2010), Texas Surface Water Quality Standards (TSWQS) saltwater fish criteria (specifically the ^{SW}RBELs) were compared to measured concentrations of COIs in Intracoastal Waterway surface water (Table 4), Intracoastal Waterway

Background surface water (Table 5), wetlands surface water (Table 11), and Pond surface water (Table 12). The saltwater fish criteria represents a screening concentration in water that, above this level, may adversely impact humans eating fish caught in a given water body. The comments (EPA, 2010) requested that the Intracoastal Waterway and wetlands surface water be considered sustainable fisheries and measured concentrations in these media be compared with the TSWQS saltwater fish criteria, while the ponds be considered incidental fisheries, which allowed a factor of ten to be multiplied by the criteria prior to comparison with the site data.

No COIs were measured above the saltwater fish criteria in the surface water samples from the Intracoastal Waterway near the Site (Table 4). 4,4'-DDD, 4,4'-DDT, aldrin, and benzo(k)fluoranthene were detected in at least one surface water sample collected from the background area of the Intracoastal Waterway at concentrations above the saltwater fish criteria (Table 5). Total manganese and mercury concentrations was reported in at least one surface water sample collected from the wetlands area at levels above the saltwater fish criteria (Table 11). Dissolved manganese was measured in at least one surface water sampled collected from the wetlands area at a level above the saltwater fish criteria (Table 11). Total arsenic, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and thallium were measured in at least one surface water sample collected from the ponds at a concentration above the saltwater fish criteria for an incidental fishery (Table 12). Dissolved manganese was measured in at least one surface water sample collected from the ponds at a concentration above the saltwater fish criteria (Table 12).

Although the above TSWQS comparisons noted a few exceedences in the wetland and pond surface water samples, it is unlikely that there are consumable or desirable fish in these waters. The Small Pond is a shallow depression (on the order of a few inches deep) that often becomes dry during summer months and periods of drought. The Fresh Water Pond is believed to be a borrow pit with little vegetation and, thus, minimal habitat for fish. During the period over which the RI was performed, there were no indications of fish in this pond nor were any fishing activities observed. The wetlands are hydrologically isolated from Oyster Creek (and the Intracoastal Waterway), except during intermittent, and typically brief, flooding events. This lack of hydraulic connection prevents the wetlands from being a hatchery or nursery for fish that, as they mature, could move to larger water bodies. In addition, it is unlikely that fish of consumable size live in the wetlands given the shallow depth of standing water.

2.2.2 Comparison to the Background Areas

The background evaluation was conducted using the approach outlined on page 5-19 of EPA guidance (EPA, 1989), which indicates “If inorganic chemicals are present at the site at naturally occurring levels, they may be eliminated from the quantitative risk assessment”. COIs were retained for further evaluation in the BHHRA if they were measured in Site media at concentrations that were statistically different (higher) than background soils.

To help provide an understanding of what COIs and concentrations are considered to be Site-related, a background evaluation was conducted (as described in the Work Plan (PBW, 2006a)) that included: 1) soil samples from ten off-site locations; 2) sediment samples from nine off-site locations in the Intracoastal Waterway; and 3) surface water samples within four off-site “zones” in the Intracoastal Waterway. This information was used to characterize Site conditions in the NEDR (PBW, 2009).

The soil background data were compared to soil from the South Area and North Areas of the Site, as well as sediments from the North wetland and the North Area ponds. As described in the NEDR (PBW, 2009), based on similarities in composition and condition between background soil and sediments of the North wetlands area, this comparison was appropriate. Sediment and surface water data for the Intracoastal Waterway samples were compared to sediment and surface water data collected in the Intracoastal Waterway background location.

Comparisons between Site sampling data and Site-specific background data were conducted for all inorganic compounds measured regardless if they exceeded the concentration-toxicity screen. The background comparisons were performed in accordance with EPA’s *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites* (EPA, 2002d). Distribution testing was conducted to estimate 95% UCLs and the summary statistics were used to perform comparison of the means analyses. The output of these background statistical comparison tests is provided in Appendix B. Table 18 summarizes the results of the testing and indicates whether the Site data were found to be statistically different than the background data.

In several instances (e.g., lithium in South Area soil; barium in North Area wetlands sediment), statistical differences between the two data sets were due to higher concentrations in the background population, as noted in Table 18. If there was not Site-specific background data for a COI (as noted in Table 18 with an “NA”) and it was measured in excess of 1/10th of the screening level, the COI was retained for further evaluation in the BHHRA (e.g., iron). COIs shown to be statistically different (and higher) when compared to background data were also retained for quantitative evaluation in the BHHRA.

A statistical comparison between Site surface water and background surface water could not be conducted given the small size of both data sets. Visual inspection of the data indicates that there is no consistent observable difference between the data sets for the COIs. It should be noted, however, that all COIs in surface water were screened out during the toxicity-concentration step and are not evaluated further in the BHHRA.

Background groundwater data were not collected as part of the RI. Therefore, all COIs detected in Zone A groundwater, as shown in Tables 3 and 10 for the South Area and North Area, respectively, were evaluated quantitatively in the BHHRA and are discussed in greater detail in the following sections.

2.2.3 Summary of Potential Chemicals of Concern

The PCOCs carried through the BHHRA for soil, surface water, and sediment are listed in Table 19. For a COI to be considered at PCOC, it was:

- Measured in more than five percent of the samples for a given media;
- Measured at a concentration greater than 1/10th of the screening criteria or measured but no screening criteria are available; and
- Measured at a concentration statistically greater than what is considered background.

PCOCs were quantitatively evaluated further in the BHHRA. Based on the comparison with screening criteria, COIs measured in surface water and, thereby, the surface water pathway were eliminated from further evaluation in the BHHRA because none were measured above their respective screening value. Likewise, the pathway for off-site residential exposure to fugitive dust and VOC emissions from soils at the South Area and North Area was eliminated from further evaluation because no COIs were measured above their screening criteria for this pathway. These media, South Area and North Area soil, were retained for further evaluation for other receptors and pathways. Table 20 summarizes the media of interest, potential exposure pathways by media, and the general outcome of the screening process for that media.

3.0 EXPOSURE ASSESSMENT

The exposure assessment estimates the extent of human contact with PCOCs by characterizing potentially exposed populations (i.e., receptors), identifying actual or potential routes of exposure, and quantifying the intake (or dose) of human exposure. The exposure assessment also identifies possible exposure pathways that are appropriate for each potential receptor and exposure scenario and considers the source of contamination and fate and transport properties of the compound and surrounding environment. An exposure pathway typically includes the following elements:

- A source of contaminant and mechanism of contaminant release;
- An environmental retention or transport medium (e.g., air, groundwater, etc.);
- A point of contact with the medium (i.e., receptor or potentially exposed population); and
- A route of human intake (e.g., inhalation, ingestion, etc.).

Each of these elements must generally be present for an exposure pathway to be complete, although it is not necessary that environmental transport occurs when assessing exposure from direct contact. Exposure was evaluated for both current and potential future receptors to allow for evaluation of long-term risk management options.

3.1 POTENTIAL EXPOSURE PATHWAY EVALUATION

The identification of potentially exposed populations (also called receptors) possibly at risk from exposure to PCOCs at the Site is dependent on current and future land uses. The Site is located at 906 Marlin Avenue in Freeport, TX, as shown on Figure 1.

The Site consists of approximately 40 acres within the 100-year coastal floodplain along the north bank of the Intracoastal Waterway between Oyster Creek to the east and the Old Brazos River Channel to the west (Figure 1). Approximately 78 people live within the one square mile area surrounding the Site (EPA, 2005a). Approximately 3,392 people live within 50 square miles of the Site (EPA, 2005a). There are no schools, nursing homes, or other sensitive subpopulations within a mile of the Site. Residential areas are located south of Marlin Avenue, approximately 300 feet west of the Site, and 1,000 feet east of the Site.

3.1.1 Land Use Evaluation

Historically, the South Area of the Site was used as a barge cleaning and maintenance facility. The Site currently is unused but it is anticipated that the South Area will be used for commercial/industrial purposes in the future. The South Area includes approximately 20 acres of upland that was created from dredged material from the Intracoastal Waterway. To the west of and directly adjacent to the Site is an unused lot that was formerly a commercial marina. West of that lot, beyond a second vacant lot, is a residential development with access to the Intracoastal Waterway. An active commercial operation is located east of the South Area.

The North Area of the Site contains closed surface impoundments (closed in 1982) and is, for the most part, unused. Some of the North Area is upland created from dredge spoil, but most of this area is considered wetlands (Figure 2) and the wetlands area has never consistently been used. According to the National Wetlands Inventory map for the Freeport Quadrangle, the wetlands on the north of the Site are estuarine, intertidal, emergent, persistent, and irregularly flooded. The upland area of the North Area has been used as a parking lot. Future land use at the North Area is limited given that much of it is considered wetlands and most of the upland part of the North Area consists of the closed former surface impoundments.

3.1.2 Groundwater Use Evaluation

Because of high total dissolved solids in Zone A, B, and C groundwater at the Site, the groundwater ingestion and use pathway is incomplete for these three units. Also, as noted previously, restrictive covenants prohibiting groundwater use have been filed for the Site. Based on Site potentiometric and analytical data presented in the NEDR (PBW, 2009), impacted groundwater does not affect surface water at the Site. Additional information regarding the geologic and hydrogeologic characteristics of these units will be provided in the RI Report.

3.1.3 Surface Water Use Evaluation

The Intracoastal Waterway supports barge traffic and other activities. It is one of the main arteries for shipping goods from Freeport’s deep-water port to destinations along the Texas Coast and beyond. Fishing boats also use the Intracoastal Waterway to gain access to the fishing grounds in the Gulf of

Mexico and the shorelines, tributaries, and marshes of the many Texas Bays. The area near the Site is regularly dredged. The nearby residential areas have canal access to the Intracoastal Waterway.

As noted previously, impacted groundwater does not discharge to surface water at the Site. However, surface water data were collected for the Intracoastal Waterway, as well as surface waters contained in the wetlands and ponds on the North Area to evaluate the potential for contaminants in surface soils to be released to surface water via overland surface runoff.

3.1.4 Fish and Shellfish Resources Evaluation

As mentioned previously, fishing and crabbing are reported to occur in waters of the Intracoastal Waterway in the general vicinity of the Site. Fishing and crabbing have not been observed in the wetlands or ponds of the North Area primarily because neither provide suitable habitat for consumable fish or blue crabs (e.g., larger fish and mature blue crabs prefer deeper water habitat).

Subsistence fishing was not considered in the Intracoastal Waterway Fish Ingestion Pathway Human Health Baseline Risk Assessment (PBW, 2007) because of the small shoreline of the Site and other considerations described below. Subsistence fishing is generally characterized by individuals who catch fish as their primary protein source and, although a formal study has not been conducted, there are no known subsistence populations in the Freeport area. The habitat along the Intracoastal Waterway is generally not conducive to attracting and keeping fish and their prey due to the poor sediment base that results from scouring, dredging and wave action from barge traffic. Moreover, given the significant barge and boat traffic in the area, it is unlikely that a fisherman would routinely fish near the Site due to safety concerns. It was, therefore, assumed that a recreational fishing scenario best represented possible and likely fishing patterns in the Intracoastal Waterway near the Site.

Molluscan shellfish harvesting is currently banned by the TDSHS in all waterbodies from an area about two miles east of the Site, to well beyond the Brazos River inlet, about 7 miles west of the Site (TDSHS, 2009). The ban has been enacted because of poor conditions and water quality. It should be noted, however, that risk from molluscan shellfish consumption harvested from the area if allowed would most likely not pose a human health risk, since exposure would be similar if not the same as for the fish and crab (a crustacean shellfish) ingestion pathway, which as described in Section 5.4 below was found to pose an acceptable risk in the Site vicinity. However, bioaccumulation of fish and shellfish, including molluscan and crustacean shellfish, can be different and may impart uncertainty in the analysis if molluscan shellfish are consumed. Additional discussion related to this potential uncertainty is presented in Section 6.2.

3.2 POTENTIALLY EXPOSED POPULATIONS

Potentially exposed populations were based on current and reasonable future land use, groundwater use, and surface water use. Table 20 describes the potentially exposed populations that may encounter COPCs at the Site. Table 21 summarizes the various exposure scenarios evaluated in the BHHRA by media. While exposure might occur at the background locations, exposure and potential risks for the background areas were not evaluated in the BHHRA.

Potentially exposed populations for the South Area and North Area include:

1. future commercial/industrial workers;
2. future construction workers at the Site;
3. current/future youth trespasser (although the South Area perimeter is fenced, this area could still be accessed by a trespasser via the Intracoastal Waterway);
4. contact recreation receptor ; and
5. off-site residential receptor.

Soil is the primary media of concern for the commercial/industrial worker, construction worker, and youth trespasser receptor while surface water and sediment are the primary media of concern for the contact recreation receptor. A future indoor air exposure pathway was evaluated for the commercial/industrial worker since VOCs were detected in Zone A groundwater. Additionally, a contact recreation scenario was assessed for surface water and sediment in the Intracoastal Waterway, wetlands, and ponds to represent a hypothetical person that occasionally contacts these media while swimming, wading, or participating in other recreational activities. Potential impacts from fugitive dust generation and VOC emissions, and subsequent exposure to nearby residents were also considered in the BHHRA as shown in Tables 16 and 17 and discussed in Section 2.2.1. It should be noted that the off-site residential receptor and surface water exposure to the contact recreation receptor were eliminated from further quantitative evaluation in the BHHRA, as described in Section 2.2.

A recreational fishing receptor was identified as the potential receptor of concern in the Fish Ingestion Pathway Human Health Baseline Risk Assessment (PBW, 2007), and a quantitative evaluation of risks for this potentially exposed population was presented in the report. The conclusions of that report are summarized in Section 5.4.

3.3 CONCEPTUAL SITE MODELS AND POTENTIALLY COMPLETE EXPOSURE PATHWAYS

A conceptual site model (CSM) identifies exposure pathways for potentially complete pathways at the Site and describes the process or mechanism by which human receptors may reasonably come into contact with Site-related constituents. A CSM was developed as part of the Work Plan (PBW, 2006a) to focus the data collection activities of the RI so that analytical data could support a risk-based analysis. These preliminary CSMs were included as Figures 7 and 8 in the Work Plan (PBW, 2006a) and summarized exposure to the North Area and South Area, respectively.

Figures 4 and 5 of the BHHRA provide revised CSMs for the South and North Areas, respectively, which were refined to reflect current information about the Site. These revised CSMs were used to develop the quantitative exposure assessment of the BHHRA. Complete pathways are indicated with a bold line and check in the potential receptors column. Incomplete pathways are denoted with an “X” and a footnote indicating why the pathway is incomplete.

At the South Area, PCOCs were potentially released from historical Potential Source Areas (PSAs) to the soil and may have migrated to groundwater via leaching through the soil column, and to surface water in the Intracoastal Waterway via overland surface runoff. Once in surface water, some compounds tend to stay dissolved in the water whereas some tend to partition to sediment. Volatilization and fugitive dust generation may have caused PCOCs in soil to migrate within the Site or off-site. Exposure to on-site receptors may also occur directly from contact to the soil. However, based on PCOC data for surface soil samples collected on Lots 19 and 20 directly west of the Site (see Section 2.4.2 of the NEDR for detailed discussion of these data (PBW, 2009)) and the qualitative screening conducted for the off-site residential receptor described in Section 2.2, it does not appear that significant entrainment and subsequent deposition of particulates occurred at the Site or at off-site locations. Once in groundwater, VOCs may migrate with the groundwater and/or volatilize through the soil pore space and be emitted into outdoor or indoor air.

At the North Area, PCOCs were potentially released from historical PSAs to the soil and/or may have migrated to groundwater. PCOCs may have also migrated from soil to surface water and sediments in the nearby wetlands area via overland surface runoff. Fugitive dust generation was considered a potentially significant transport pathway for PCOC migration on-site and evaluated quantitatively in the BHHRA for the on-site receptors although this pathway was eliminated during the screening process for the off-site residential receptor. Once in groundwater, VOCs may migrate with the groundwater and/or volatilize through the soil pore space and be emitted into outdoor or indoor air.

It was assumed, as part of the risk assessment, that these media were potentially contacted by the various hypothetical receptors possibly at the Site and, as such, these exposure pathways were potentially complete. The remainder of this section describes how exposure was quantified for each of these complete exposure pathways.

3.4 QUANTIFICATION OF EXPOSURE

In keeping with EPA guidance (EPA, 1992c), the goal of the exposure assessment was to provide a reasonable, high-end (i.e., conservative) estimate of exposure that focuses on potential exposures in the actual population. This concept is termed the reasonable maximum exposure (RME) approach. This should not be confused with: (1) a worst-case scenario which refers to a combination of events and conditions such that, taken together, produces the highest conceivable exposure; or (2) a bounding estimate that purposefully overestimates exposure (EPA, 1992c). Thus, in accordance with EPA guidance, site-specific exposure assumptions and parameters were used when available and, when not available, assumptions were deliberately chosen to represent a high-end RME estimate (EPA, 1989). A central tendency or average scenario was also evaluated to provide a range of exposures.

Chemical exposure is quantified by the calculation of an intake, or dose, that is normalized to body weight and exposure time of the receptor. A dose is calculated by combining assumptions regarding contact rate (intake amount and time, frequency and duration of exposure) to a contaminated medium with representative chemical exposure point concentrations for the medium of concern at the point of contact. Receptors are chosen based on their exposure patterns that may put them at risk or at a higher risk than other individuals. Intake assumptions, in general, were based on central tendency or RME assumptions determined by EPA (1989; 1991a), or were based on information obtained from site-specific studies. Reasonable maximum exposure scenarios use a combination of assumptions, such as average values for physical characteristics of the receptors (body weight and corresponding body surface area), UCL values (values at the 90 or 95 percentile of the distribution) for contact rate, and UCL on the mean

(95 percent UCL) for the exposure point concentrations. The combination of these factors is assumed to provide an upper-bound estimate of exposure and risk to that particular receptor.

The intake or dose of a particular compound by a receptor is quantified with the generic equation below (EPA, 1989):

$$I = \frac{C \times CR \times EFD}{BW} \times \frac{1}{AT} \qquad \text{(Equation 1)}$$

where:

I	=	the compound intake or dose (mg/Kg BW-day);
C	=	the compound concentration (mg/Kg or mg/L);
CR	=	contact rate or the amount of contaminated medium contacted per event (L/day or mg/day);
EFD	=	the frequency (days/year) and duration (number of years) of exposure days;
BW	=	the average body weight of the receptor (Kg); and
AT	=	averaging time of the exposure (days); for noncarcinogens, AT equals (ED) x (365 day/year); for carcinogens, AT equals (70 years over a lifetime) x (365 day/year).

This equation calculates an intake that is normalized over the body weight of the individual and the time of the exposure. Because the intake or dose is combined with quantitative indices of toxicity (chemical-specific dose-response information such as reference doses (RfDs) for noncarcinogenic compounds or cancer slope factors (CSFs) for carcinogenic compounds, which is discussed further in Section 4.0) to give a measure of potential risk, the intake or dose must be calculated in a manner that is compatible with the quantitative dose-response information for chemical constituents evaluated in the analysis. Two different types of health effects are considered in this analysis: 1) carcinogenic effects and 2) noncarcinogenic effects (either chronic or subchronic, depending on the receptor’s exposure).

For carcinogenic effects, the relevant intake is the total cumulative intake averaged over a lifetime because the quantitative dose-response function for carcinogens is based on the assumption that cancer results from chronic, lifetime exposures to carcinogenic agents. This intake or dose is then averaged over a lifetime to provide an estimate of intake or dose to carcinogens as (mg/Kg-day), which is expressed as a lifetime average daily dose (LADD). Thus, for potentially carcinogenic compounds, the averaging time (AT) is equal to 70 years (EPA, 1989).

Noncarcinogenic effects are evaluated for chronic, subchronic, or acute exposures by receptors to systemic or reproductive toxicants. For noncarcinogenic effects, the relevant intake or dose is based on the daily intake averaged over the exposure period of concern. As defined in EPA guidance (EPA, 1989), an exposure period for toxicity can be either acute (exposure occurring from one event or over one day), subchronic (cumulative exposures occurring from two weeks up to seven years), or chronic (cumulative exposure over seven years to a lifetime in duration). The quantitative dose-response function for noncarcinogenic effects (chronic and subchronic) is based on the assumption that effects occur once a threshold dose is attained from repeated exposure. Therefore, the intake or dose for noncarcinogenic risk assessment is based on an average daily dose (ADD) that is averaged over the duration of exposure. The averaging time for assessing noncarcinogenic effects is equal to the exposure duration for the receptor. In the BHHRA, exposure was assumed to be chronic for all receptors even though some exposures described in this report were intermittent or less than chronic duration.

3.4.1 Estimating the Exposure Point Concentration

The exposure point concentration (EPC) is meant to be "a conservative estimate of the average chemical concentration in an environmental medium" (EPA, 2002b). The EPA (2002b) also states that the 95% UCL should be used as the EPC for a given area and its sample concentrations. The EPA's ProUCL Version 4.00.04 software program (EPA, 2009) was used to calculate distribution-free (i.e., nonparametric) 95% UCL concentrations from data sets including non-detect concentration values (i.e., represented by the sample quantitation limit). ProUCL calculates various types of the 95% UCL, and then makes a recommendation for the most appropriate UCL type. In instances where the generated output did not indicate a recommended UCL type, then rules based on the EPA guidance (EPA, 2009) were used to choose the most appropriate UCL. If the sample size was small or there was a large proportion of non-detect concentrations in a particular data set, EPA guidance (EPA, 2009) noted that a computed 95% UCL would not be reliable or justifiable. Instead, the guidance recommended using the median or mode value of the entire data set (i.e., detected and non-detected concentrations) to represent the EPC.

The following rules were used to select the most appropriate UCL based on EPA guidance (EPA, 2009), based on the nature of the data set:

1. Select the recommended UCL, unless the number of detections was less than 8.
2. If the number of detections was less than 8, compute median value of entire data set and select it for the EPC.

3. If number of detections is 8 or more, **and** no UCL is recommended **and** non-detects are less than five percent **and** data distribution appears normal (often the case for metals) **and** there are not multiple sample quantitation limits, then select the Winsor (t) UCL or the Student's (t) UCL.
4. If number of detections is 8 or more **and** no UCL is recommended **and** non-detects are greater than five percent, then select the highest Kaplan-Meier (KM) UCL other than the 99% KM (Chebyshev) UCL (considered to be too conservative) if it is less than the maximum detected value.
5. If the number of detections is 8 or more **and** no UCL is recommended **and** non-detects are less than five percent **and** data distribution is not normal, then select the highest KM UCL other than the 99% KM(Chebyshev) (conserved too conservative) UCL if it is less than the maximum detected value.

Appendix A provides the ProUCL output when there were sufficient samples to generate statistics (soil and sediment). It should be noted that when evaluating exposure from fugitive dust generation, the EPC was based on surface soil data because it is unlikely that deeper soils (i.e., soils below a depth of 0.5 ft) are transported as wind-borne dust.

Both averages and 95% UCLs (or means or medians where appropriate as discussed above) were used in the BHHRA to provide a range of EPCs and are summarized in Tables 1 through 15. The dose estimates using the 95% UCL EPC were considered to represent reasonable maximum exposure (RME). The average was used to represent the average or central tendency exposure. It should be noted that with more robust data sets, the average and 95% UCL EPCs are very similar. It should also be noted that often, for data sets with a high percentage of non-detects, the average of detected data are higher than the recommended UCL (or RME) value since, with these types of datasets, the median value is often the recommended UCL and is often lower than the average of the detected data.

3.4.2 Quantifying Intake

To quantify potential exposures associated with the pathways of potential concern, Equation 1 is modified according to the specific exposure routes and intake assumptions.

Incidental Ingestion of Soil. The intake or dose for the incidental ingestion pathway from soil is calculated based on the following equation (EPA, 1989):

$$ADD_{ing} = \frac{Conc_{soil} \times IR \times FI \times AAF \times EF \times ED \times CF}{BW \times AT} \qquad \text{(Equation 2)}$$

where:

ADD_{ing}	=	average daily intake of compound via ingestion of soil (mg/Kg BW-day);
$Conc_{soil}$	=	exposure concentration in soil (mg/Kg);
IR	=	ingestion rate (mg soil/day);
FI	=	fraction ingested (unitless);
AAF	=	absorption adjustment factor (fraction absorbed);
EF	=	exposure frequency (days/year);
ED	=	exposure duration (years);
CF	=	conversion factor (10^{-6} Kg/mg);
BW	=	body weight (Kg); and
AT	=	averaging time (days).

The exposure concentration in the soil ($Conc_{soil}$) is the concentration of a PCOC at the point of contact. Exposure point concentrations represent random exposure over the exposure unit and were discussed in greater detail in the Section 3.4.1. The ingestion rate (IR) is the amount of soil incidentally ingested per day or event. For soil, the incidental intake values vary according to the receptor and the specific activities or exposure patterns that the receptor is engaged in at the Site.

The fraction ingested (FI) relates to the fraction of soil that is contacted daily from the contaminated area. This is highly dependent on the different activities that an individual is engaged in and the number of hours (fraction of time) spent in the contaminated portions of the site (EPA, 1989). The fraction ingested was conservatively assumed to be 100 percent. The absorption adjustment factor (AAF) is used in the ingestion pathway to account for differences in relative absorption for the chemical from the test vehicle versus the exposure medium (i.e., soil) and was assumed to be 1.0 unless compound-specific data were available to suggest otherwise. (The test vehicle is the material (e.g., soil, food, or solvent) in which the chemical was administered in the toxicity study.) Body weight (BW) varies according to the age range of the receptor. Adult receptors are assumed to weigh 70 kilograms (Kg), which corresponds to the 50th percentile value for all adults, as recommended by EPA (1989). For receptors other than adults, body weight is dependent on the age of the receptor and is calculated as the time-weighted average body weight using values reported by the *Exposure Factors Handbook* (EPA, 1997a). The exposure frequency (EF) and duration (ED) of the event is based on the particular exposure pattern and activity related to the receptor (EPA, 1997a). The averaging time is 70 years for carcinogenic effects, and for noncarcinogenic effects depends on the frequency and duration of exposure for the particular receptor (EPA, 1989; 1991a).

Dermal Contact with Soil. When calculating intake via dermal contact with soil or sediment, Equation 1 is modified slightly to account for skin surface area, soil-to-skin adherence factors, and chemical-specific absorption factors. An intake or dose is quantified from dermal contact with the equation (EPA, 1989):

$$ADD_{der} = \frac{Conc_{soil} \times SA \times AF \times AAF \times EF \times ED \times CF}{BW \times AT} \qquad \text{(Equation 3)}$$

where:

ADD_{der}	=	average daily dose from dermal contact with chemical in soil (mg/Kg-day);
$Conc_{soil}$	=	exposure concentration in soil (mg/Kg);
SA	=	skin surface area available for direct dermal contact (cm^2/event);
AF	=	soil/sediment to skin adherence factor (mg/cm^2);
AAF	=	absorption adjustment factor (unitless)
EF	=	exposure frequency (days or events/year);
ED	=	exposure duration (years)
CF	=	conversion factor (10^{-6} Kg/mg);
BW	=	body weight (Kg); and
AT	=	averaging time (days).

The exposed skin surface area (SA) is the area or portion of the body exposed for dermal contact. As with many exposure variables, surface area depends on the age and exposure pattern that the receptor is engaged in that relate to repeated or average exposure. Surface area can be predicted based on factors such as activity and types of clothing. Typical exposures via dermal contact for most receptors are generally limited to certain parts of the body (e.g., hands, forearms, head, and neck) since clothing tends to significantly reduce the potential for direct contact with soil (Kissel, 1995). The soil adherence factor (AF) is the density of soil adhering to the exposed fraction of the body. The adherence factor is highly dependent on the specific activity of the receptor as well as physical properties of the soil (e.g., moisture content, textural class, and organic carbon content) (Kissel et al., 1996). The AAF accounts for the relative absorbance of a chemical between dermal exposure from the environmental medium and oral exposure in the critical toxicity study, which was used to derive the dose-response information for that chemical. Therefore, the AAF is highly chemical-specific and, unless otherwise noted, was assumed to be 1.0. Factors such as body weight, exposure frequency, exposure duration, and averaging time are similar to that discussed above for incidental ingestion.

Inhalation of Volatiles and Fugitive Dusts. An intake or dose from inhalation of vapors or particles emitted from the Site is calculated by modifying Equation 1 to account for the volatilization and/or particulate emission factor and the difference in methodology when evaluating air impacts (i.e., dose was not calculated, but rather an effective air concentration that the receptor may be exposed to was calculated). An effective air concentration was generally calculated using the following equation:

$$EAC = {Conc_{soil} \times VF \times EF \times ED}/{AT} \qquad \text{(Equation 4)}$$

where:

EAC	=	effective air concentration (mg/m^3);
$Conc_{soil}$	=	exposure point concentration in soil (mg/Kg);
VF	=	volatilization factor (mg/m^3-air/Kg-soil) and/or particulate emission factor:
EF	=	exposure frequency; describes how often exposure occurs (days/year);
ED	=	exposure duration; describes how long exposure occurs (years); and
AT	=	averaging time; period over which exposure is averaged (days).

A risk assessment from inhalation of volatiles and dusts is different from the quantification of potential risks from dermal contact or incidental ingestion. Risks from inhalation exposure are based on a comparison of a measured or calculated air concentration (effective air concentration) to a risk-based acceptable air concentration, either a reference concentration (RfC) or an inhalation unit risk (IUR) value. Where monitoring data do not exist, an exposure point concentration in air can be calculated based on a volatilization model and/or particulate emissions factor and the exposure point concentration in soil. Surface soil data were used when estimating the air concentration for particulate dust generation.

3.4.3 Exposure Assumptions and Intake Calculations

The exposure assumptions are provided in Tables 22, 23, 24, and 25 for the industrial worker, construction worker, youth trespasser, and contact recreation receptors, respectively. References for the various assumptions are provided in the tables and citations are listed in Section 8.0. Appendix C provides the detailed spreadsheets for the intake calculations for the different receptors for the South and North Areas of the Site. Tables 16 and 17 and Section 2.2.1 describe the evaluation of potential impacts from volatile emissions and fugitive dust generation from Site soils to off-site residential receptors.

3.4.4 Vapor Intrusion Pathway for Future On-Site Worker Scenarios

Except for an AST farm, a dry dock, and a former transformer shed, there are currently no structures present on the South or North Areas at the Site. However, future development of the area may result in construction of buildings at the Site. In the event that permanent and enclosed structures are built on-Site in the future, the Johnson and Ettinger Vapor Intrusion Model (J&E VIM) (EPA, 2002a) was used to assess the potential migration of volatile chemicals from groundwater into the breathing space of an overlying building. Exposure estimates are calculated in the model using default exposure parameters for an industrial worker similar to those provided in Table 22 and site-specific soil and hydrogeologic properties. While a construction worker could also be exposed to VOCs migrating from groundwater to outdoor air, that exposure and risk scenario was not calculated separately since it is likely to be less than the industrial worker's exposure under the indoor air scenario since there would be greater dispersion and mixing in the ambient outdoor air that a construction worker would encounter (no dispersion and mixing is assumed with the J&E VIM), and because the construction worker's exposure frequency and duration is less than the industrial worker's.

The input parameters used to run the J&E VIM Version 3.1 followed EPA guidance on the subject and recommended values (EPA, 2002a) that are available on-line at www.epa.gov/oswer/riskassessment/airmodel/johnson_ettinger.htm . Site-specific input variables used in the model are described below. The model was only run for those compounds that are considered volatile since non-volatile compounds would not migrate from the groundwater to the overlying soil pore space and to ambient air via this pathway. As noted previously, a restrictive covenant is currently in place for Lots 55, 56, and 57 and requires any building design to preclude vapor intrusion. Thus, this evaluation represents a conservative assessment of the vapor intrusion pathway for these lots.

The site-specific variables used in the J&E model were determined from information gathered during previous Site investigation and presented in the NEDR (PBW, 2009). Depth below grade to the bottom of a hypothetical enclosed space floor was assumed to be 15 cm, or the thickness of a typical slab (basement construction was not considered due to the geographic location of the Site). Depth below grade to the water table was conservatively estimated to be 5 feet (152 cm) based on water gauging data from both North and South Area monitoring wells. Clay (USCS code CL) was selected as the soil type directly above the water table, which is the dominant soil type in shallow soils at both the North and South Areas as indicated on the boring logs provided in NEDR (PBW, 2009). The average soil/groundwater temperature used in the model was 25° C based on the geographical location of the site and regional climatic conditions.

Both average and RME EPCs were used in the calculations to provide a range of exposure and potential risks. These values are listed in Tables 26 and 27, respectively for the South Area and North Area groundwater. Estimated risks are provided and discussed in Section 5.0.

4.0 TOXICITY ASSESSMENT

The toxicity assessment provides a description of the relationship between a dose of a chemical and the anticipated incidence of an adverse health effect (Preuss and Ehrlich, 1987 and EPA, 1989). The purpose of the toxicity assessment is to provide a quantitative estimate of the inherent toxicity of PCOCs to incorporate into the risk characterization. Toxicity values are derived from the quantitative dose response association and are correlated with the quantitative exposure assessment in the risk characterization.

For risk assessment purposes, toxic constituent effects are separated into two categories of toxicity: carcinogenic effects and noncarcinogenic effects. This division relates to the EPA policy that the mechanisms of action for these endpoints differ. Generally, the EPA has required that potentially carcinogenic chemicals be treated as if minimum threshold doses do not exist (EPA, 1986), whereas noncarcinogenic effects are recognized to have a threshold below which toxicity is unlikely.

4.1 EXPOSURE ROUTE-SPECIFIC TOXICITY CRITERIA

In deriving toxicity criteria, EPA methodologies consider the route of administration (or exposure) of the test chemical in toxicity or epidemiological studies. Typically oral reference doses (RfDs) and oral cancer slope factors (CSFs) are derived from toxicity studies with oral administration or exposure route, and reference concentrations (RfCs) or inhalation unit risks are derived from inhalation toxicity studies. While one could attempt to extrapolate an inhalation toxicity criterion to the oral pathway or visa versa, this practice is not recommended because there can be a great deal of uncertainty introduced (EPA, 1989). Therefore, in the BHHRA, oral RfDs were not extrapolated to provide toxicity values for inhalation pathways. Quantitative risk evaluation of the inhalation exposure pathways was conducted only for those chemicals that have reference toxicity values specifically from inhalation administration.

On the other hand, EPA has not derived specific toxicity criteria for the dermal exposure pathway. This presents a complication because oral and inhalation toxicity criteria are based on administered dose and not absorbed dose while dermal exposure pathways consider the absorbed dose (i.e., how much of the chemical in soil or water crosses the skin barrier and is absorbed by the body). Per EPA (1989), the oral RfD or oral CSF can be applied in evaluation of the dermal exposure pathway following adjustment of the oral toxicity criteria for gastrointestinal absorbance. In later guidance (EPA, 2004b), EPA recommends adjusting oral toxicity criteria by gastrointestinal absorbance factors if gastrointestinal absorbance of the chemical in the vehicle of administration in the critical study is less than 50 percent. Generally, organic chemicals are assumed to be relatively bioavailable in oral and gavage toxicity studies and, thus, the administered dose is likely to be similar to absorbed dose. Therefore, no adjustment of oral toxicity criteria is recommended for organic PCOCs (EPA, 2004b). EPA recommends adjusting oral toxicity criteria for a number of inorganic constituents based on the possibility of low gastrointestinal absorbance in the critical study as shown in Exhibit 4-1 of the associated guidance (EPA, 2004b). It should be noted that none of the PCOCs quantitatively evaluated in the BHHRA are recommended for the adjustment described above.

4.2 CARCINOGENIC EFFECTS

Potential carcinogenic effects resulting from human exposure to constituents are estimated quantitatively using CSFs, which represent the theoretical increased risk per milligram of constituent intake/kilogram body weight/day $(mg/Kg\text{-}day)^{-1}$ or unit risks, which are the theoretical increased risks per exposure concentration. CSFs or unit risks are typically derived for "known or probable" human carcinogens. CSFs or unit risks are used to estimate a theoretical upper-bound lifetime probability of an individual developing cancer as a result of exposure to a particular lifetime daily dose of a potential carcinogen. Constituents that are believed to be carcinogenic may also have non-cancer effects. Potential health risks for these constituents are evaluated for both cancer and other types of effects as described below.

4.3 NONCARCINOGENIC EFFECTS

Unlike carcinogenic effects, it is widely accepted that noncarcinogenic biological effects of chemical substances occur only after a threshold dose is achieved (Klaassen et al., 2007). This threshold concept of noncarcinogenic effects assumes that a range of exposures up to some defined threshold can be tolerated without appreciable risk of harm. Adverse effects may be minimized at concentrations below the threshold by pharmacokinetic processes, such as decreased absorption, distribution to non-target organs, metabolism to less toxic chemical forms, and excretion (Klaassen et al., 2007).

RfD values and RfCs are developed by the EPA RfD Work Group on the basis of a wide array of noncarcinogenic health effects. The RfD and RfC are estimates of the daily maximum level of exposure to human populations (including sensitive subpopulations) that are likely to be without an appreciable risk of deleterious effects during a lifetime (EPA, 1989). RfDs are expressed in units of daily dose (mg/Kg-day) while RfCs are expressed as an air concentration (mg/m^3). Both incorporate uncertainty factors to account for limitation in the quality or quantity of available data.

4.4 SOURCES OF TOXICITY CRITERIA

There are a variety of toxicity databases that regulatory agencies rely on for the purposes of quantifying the toxicity of chemicals in the environment. Per EPA (1989 and 2003), the primary source (i.e., “Tier 1”) for toxicity information in the risk assessment should be EPA’s IRIS (EPA, 2008). According to a recent EPA Office of Solid Waste and Emergency Response (OSWER) Directive (EPA, 2003), that revises the human health toxicity value hierarchy, if RfDs for noncarcinogenic compounds and CSFs for possible carcinogens are not available in IRIS, the “Tier 2” toxicity resource is the EPA’s database of Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV). The “Tier 3” resources that can be consulted if IRIS and PPRTV databases lack relevant toxicity criteria include the Health Effects Assessment Summary Tables (EPA, 1997b) and the Centers for Disease Control’s Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs). Toxicity values contained in the Region 6 Human Health Medium-Specific Screening Levels (EPA, 2004a) were also used as a resource for toxicity values. Regional Screening Levels (RSLs) were not available when the project began and, as such, they were not used in the screening step or as a resource for toxicity information in the BHHRA.

The toxicity criteria used in the BHHRA are provided in Appendix D, along with the risk calculations. All toxicity values were obtained from EPA’s IRIS on-line database, as accessed during December 2008.

5.0 RISK CHARACTERIZATION

Risk characterization is the integration of the exposure and toxicity information to make quantitative estimates and/or qualitative statements regarding potential risk to human health. This section describes the risk characterization process for carcinogenic and noncarcinogenic PCOCs.

5.1 POTENTIAL CARCINOGENIC RISKS

Potential carcinogenic effects are characterized in terms of the excess probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen. For chemicals that exhibit carcinogenic effects, EPA has developed a model that is based on the theory that one or more molecular events as a result of exposure to a potential carcinogenic compound can evoke changes in a single cell or a small number of cells that can lead to tumor formation. This non-threshold theory of carcinogenesis suggests that any level of exposure to a carcinogen can result in some finite possibility of generating the disease. It should be noted that this is a very conservative approach and EPA's more recent Guidelines for Cancer Risk Assessment (EPA, 2005b) recognize that there are "threshold" carcinogens as well.

To characterize the potential for carcinogenic effects, a lifetime average daily dose (LADD) is combined with a CSF to calculate a probability that an individual would develop cancer over a lifetime of exposure to a specific PCOC, with the following equation:

$$\text{Risk} = \text{LADD} \times \text{CSF} \qquad \text{(Equation 5)}$$

All risk estimates are summed for the receptor by media to provide a theoretical excess lifetime cancer risk. Theoretical excess lifetime cancer risks are evaluated based on an acceptable cancer risk range of 1 x 10^{-6} to 1 x 10^{-4}. EPA (1991b) indicates that carcinogenic effects at a site should first be evaluated based on the 1 x 10^{-4} cancer risk levels, but depending on site-specific conditions, a range of 1 x 10^{-6} to 1 x 10^{-4} may be used. Typically, cancer risks less than 1 x 10^{-6} are considered *de minimis* and acceptable while cancer risks less than 1 x 10^{-4} are considered acceptable (EPA, 1991b).

The BHHRA evaluated site-specific exposures based on realistic current and possible future land use. All cancer risk estimates fell within the EPA cancer risk range of 10^{-6} to 1 x 10^{-4} or less, except for the hypothetical industrial worker scenario at the North Area. Exposure from the vapor intrusion pathway for

PCOCs in groundwater for a hypothetical industrial worker employed in a building sited at the North Area resulted in a cancer risk greater than 1 x 10^{-4}, as shown in Table 27. Table 28 provides a summary of the cancer risk estimates for each scenario using average and RME assumptions for the soil and sediment pathways. Detailed spreadsheets containing the risk calculations are provided in Appendix D by scenario and media.

Risks were summed for the hypothetical industrial worker scenario that might be exposed to both soil and vapors emanating from groundwater, as shown in Table 28. The total risk for the hypothetical RME industrial worker at the South Area was 7 x 10^{-6} while the total risk for the hypothetical RME industrial worker at the North Area was 1.6 x 10^{-1}. The "unacceptable" risk driver for the hypothetical industrial worker scenario at the North Area was the inhalation of vapors emanating from groundwater. Risks were not summed for other soil and sediment-based receptors since adding across areas or media would, in fact, "double count" the exposure assumptions nor is it likely or determinable that a receptor will be exposed to multiple media. It would be reasonable to add surface water and sediment exposure for the contact recreation pathway but the surface water pathway was shown to be a *de minimus* risk and screened out as discussed in Section 2.2.

5.2 POTENTIAL NONCARCINOGENIC HAZARD QUOTIENTS

For noncarcinogenic compounds, a potential hazard is expressed as a hazard quotient (HQ), which is the ratio of the average daily dose (ADD) for a site-specific receptor to an acceptable dose (or RfD) for that compound. The HQ is calculated as follows

$$HQ = ADD/RfD \qquad \text{(Equation 6)}$$

An RfD is developed with the assumption that the degree of toxicity of noncarcinogenic compounds is based on the ability of organisms to repair and detoxify after exposure to a compound. The repair and detoxification mechanisms must be exceeded by some critical concentration (threshold) before the health effect is manifested. This threshold view holds that a range of exposures from just above zero to some finite value (i.e., the RfD) can be tolerated by an individual without an appreciable risk of adverse effects.

HQs are summed for all chemical intakes to yield a hazard index (HI) for each exposure pathway. An HI equal to or less than 1 indicates that no adverse noncarcinogenic health effects are expected to occur from cumulative exposure to multiple chemicals and exposure pathways. An HI greater than 1 provides an indication that such effects may occur, especially in sensitive subpopulation, but does not provide a prediction of the severity or probability of the effects. An HI above 1 indicates the need for further evaluation. For example, effects of different chemicals are not necessarily additive (although the HI approach assumes additivity), nor do all chemicals affect the same target organ. Thus, EPA recommends that if an HI exceeds 1, further evaluation should occur to categorize hazards based on chemical-specific and route-specific toxicity (e.g., which chemicals act on the same target organ, by which route of entry, etc.) (EPA, 1989).

The BHHRA evaluated site-specific exposures based on realistic current and possible future land use. Table 28 provides a summary of the HIs for each scenario using average and RME assumptions for the soil and sediment pathways. None of the HIs for the soil and sediment exposure pathways exceeded EPA's target hazard index of 1. Exposure from the vapor intrusion pathway from PCOCs in groundwater for a hypothetical industrial worker employed in a building sited at the North Area resulted in an HI greater than 1, as shown in Table 27. Detailed spreadsheets containing the risk calculations are provided in Appendix D by scenario.

Hazard Indices were summed for the industrial worker scenario that might be exposed to both soil and vapors emanating from groundwater, as shown in Table 28. The total hazard index for the RME industrial worker at the South Area was 0.09 while the total hazard index for the RME industrial worker at the North Area was 156. The "unacceptable" driver for the industrial worker scenario at the North Area was the inhalation of vapors emanating from groundwater. Hazard indices were not summed for other soil and sediment-based receptors since adding across areas or media would, in fact, "double count" the exposure assumptions nor is it likely or determinable that a receptor will be exposed to multiple media. It would be reasonable to add surface water and sediment exposure for the contact recreation pathway but the surface water pathway was shown to be a *de minimus* risk and screened out as discussed in Section 2.2.

It should be noted that due to lead's unique toxicological properties, noncancer risk estimates could not be calculated similarly to the other noncarcinogenic PCOCs. However, none of the measured concentrations of lead in Site soil samples exceeded EPA's screening level for industrial properties of 800 mg/kg (EPA, 2004a). Thus, it is unlikely that lead at the Site poses an unacceptable risk.

5.3 PATHWAYS QUALITATIVELY EVALUATED (I.E., ELIMINATED DURING SCREENING STEP)

Exposure to surface water by the contact recreation receptor and potential air impacts to off-site residential receptors were qualitatively evaluated in Section 2.2 using a concentration-toxicity screen to eliminate compounds or pathways that were unlikely to present an unacceptable risk. Based on this evaluation, it was concluded that exposure to PCOCs in these media is unlikely to result in an adverse health risk.

5.4 FISH INGESTION PATHWAY

Based on the analytical results for the Intracoastal Waterway sediment samples and in accordance with Section 5.6.8 of the Work Plan, fish tissue samples were collected from four Site zones and one background area within the Intracoastal Waterway. Red drum (*Sciaenops ocellatus*) (6 samples), spotted seatrout (*Cynoscion nebulosus*) (9 samples), southern flounder (*Paralichthys lethostigma*) (9 samples), and blue crab (*Callinectes sapidus*) (9 samples) samples were collected from the Site for laboratory analysis. Samples of these species were also collected from the background area and were archived.

The Site fish tissue samples (fillet samples for finfish, edible tissue for crabs) were analyzed for 12 COIs, based on Intracoastal Waterway sediment data, in accordance with EPA's November 14, 2006 letter. The only COIs with concentrations measured above sample detection limits in any of the 33 samples were silver (detected in four samples), benzo(b)fluoranthene (detected in two samples), and 4,4'-DDE (detected in two samples). The fish tissue data were used to calculate potential risks associated with exposure to Site COIs via the fish ingestion pathway to recreational anglers fishing at the Site, or their families.

This risk assessment (presented in a March 20, 2007 letter to EPA) concluded that the fish ingestion pathway does not pose a human health threat (PBW, 2007). That conclusion was subsequently approved in a June 29, 2007 letter from EPA.

6.0 UNCERTAINTY ASSESSMENT

Uncertainties are inherent in every aspect of a quantitative risk assessment. The inclusion of site-specific factors can decrease uncertainty, although significant uncertainty persists in even the most site-specific risk assessments. Worst-case assumptions and default values, which conform to EPA guidance (EPA, 1989), add conservatism to human health risk assessments. This conservatism is intentionally included in order to tilt the assessment toward over-prediction of risk and hence protection of human health. Therefore, it is important to the risk management decision-making process that the sources of uncertainty are provided.

A careful and comprehensive analysis of the critical areas of uncertainty in a risk assessment is an important part of the risk assessment process. EPA guidance (EPA, 1989) stresses the importance of providing a complete analysis of uncertainties so that risk management decisions take these uncertainties into account when evaluating risk assessment conclusions. The uncertainty analysis provides a context for better understanding the assessment conclusions by identifying the uncertainties that have most significantly affected the assessment results. Therefore, sources of uncertainty in the identification of PCOCs, exposure assessment, and toxicity assessment sections of the risk assessment report are identified and qualitatively evaluated in this section.

6.1 DATA ANALYSIS UNCERTAINTIES

Data collected at the Site satisfied the goals described in the Work Plan (PBW, 2006a) and, thus, adequately characterized the nature and extent of contamination at this Site. As described in the NEDR (PBW, 2009), hundreds of samples of soil, sediment, groundwater and surface water were collected at the South Area, North Area, Intracoastal Waterway, and background soil, sediment, and surface water locations. Characterization was initially conducted for the entire Site and continued at certain areas if a screening level was exceeded.

Overall, the data were determined to be of high quality. Data were collected and analyzed in accordance with approved procedures specified in the FSP (PBW, 2006b) and were validated in accordance with approved validation procedures specified in the QAPP (PBW, 2006c). Very few of the data for any of the analytes were found to be unusable (i.e., “R-flagged”). In instances where data were unusable, the analysis was conducted again (when possible) and the R-flagged data was not used. Some of the data are qualified (i.e., “J-flagged”) as estimated because the measured concentration is above the sample detection limit but below the sample quantitation limit and/or due to minor quality control deficiencies. According to the *Guidance for Data Useability in Risk Assessment (Part A)* (EPA, 1992b), data that are qualified as estimated can be used for risk assessment purposes. Data quality was discussed in greater detail in the NEDR (PBW, 2009).

Compounds were eliminated from further quantitative evaluation in the BHHRA if they were determined to be statistically no different than background concentrations, as summarized in Table 18. While this may result in an underestimation of overall site risks, this approach is appropriate for this Site given that there is no identifiable source of metals at the Site and, regardless, very few inorganic organic compounds were measured above $1/10^{th}$ of their respective screening criteria.

6.2 EXPOSURE ANALYSIS UNCERTAINTIES

The EPA risk assessment guidance for exposure assessments generally requires standard hypothetical exposure scenarios rather than realistic site-specific evaluation of exposure (EPA, 1989), and this conservative default approach was used for the future industrial and construction worker scenarios. Under this approach, if a chemical is found to be present at a site, it is assumed that exposure to that chemical will occur regardless of whether that exposure is realistic or likely. Uncertainties associated with the exposure assessment included calculation of EPCs and selection of exposure parameters. For example, the intake equations are based on several 95^{th} percentile values. When multiplied together, these data compound the uncertainties in the exposure assessments and result in estimated intakes (and resultant cancer risks) that likely estimate exposure well over the 95^{th} percentile.

It is difficult to assess the likelihood of any of the hypothetical future scenarios occurring (i.e., future construction worker or future industrial worker) nor is it possible to know the extent, if any, that trespassers and contact recreation receptors are exposed to PCOCs at the Site. It was assumed that the youth trespasser accesses the Site once a week for twelve years. It was assumed that the contact recreation scenario receptor visits the Site for 39 times per year for 25 years. The exposure assumptions used for all scenarios were chosen to purposefully overestimate exposure in order to err on the side of protection. For the current scenarios (i.e., the youth trespasser and the contact recreation scenario) it appears that these represent a bounding estimate since exposure is likely to be much less.

The screening conducted to evaluate off-site impacts from particulate dust generation and VOC emissions and migration was very conservative because it did not assume any dispersion during transport. Despite that very conservative assumption, no adverse risks to off-site residents were likely.

Soil ingestion rates for adults and older youth are highly uncertain. Because the ingestion rate is a very sensitive parameter in the intake equation, uncertainty and variability in this assumption has a large impact on the dose estimate. This is especially relevant for the construction worker scenario when an enhanced ingestion rate was used. The uncertainty related to this value is tremendous given the study design, small study population, and limited exposure length that are the basis for the soil ingestion rate.

Assumptions regarding bioavailability of metals in soil can significantly influence risk estimates. EPA typically assumes that the bioavailability of compounds from soil is equal to that observed in the toxicity studies used to derive oral toxicity factors but this is most often not the case. Rather, toxicity studies are often, if not always, conducted using a concentration of a compound in either food or water. Bioavailability was assumed to be 100% (i.e., AAF was 1.0) although it is well known that metals and some organic compounds bound to soil are less than 100% bioavailable. This assumption leads to an overestimation of risks, which can be significant.

In the fish tissue risk assessment (PBW, 2007), ingestion rates for finfish were used to represent fish and shellfish ingestion rates, and site-specific fish and crab concentrations were used to estimate exposure. It is unlikely that there is significant uncertainty presented in the fish/shellfish ingestion risk assessment based on the uptake and bioaccumulation differences between crab (a crustacean shellfish) and oysters and clams (molluscan shellfish) since exposure to molluscan shellfish, if harvesting these species were allowed, would be similar if not the same as for the fish and crab (a crustacean shellfish) ingestion pathway

For surface water and groundwater, maximum concentrations were selected as the EPC for purposes of evaluating human health risks. This is likely to be a conservative approach since there were other, lower concentrations, also measured for these media. It is unlikely that surface water concentrations would increase in the future since surface runoff does not appear to be significantly impacting surface water, and impacted groundwater does not discharge to surface water.

6.3 TOXICITY ASSESSMENT UNCERTAINTIES

The studies/basis for the toxicity information and the use of this information generate uncertainty. Toxicity assessments for many of the PCOCs in the BHHRA involve the extrapolation of results from studies on animals. The following are standard assumptions applied by the EPA when extrapolating the results of studies of carcinogenicity in animals to humans.

- Any constituent showing carcinogenic activity in any animal species will also be a human carcinogen.
- There is no threshold dose for carcinogens.
- The results of the most sensitive animal study are appropriate to apply to humans.
- Humans are more sensitive than the most sensitive animal species on a body weight basis.

Uncertainties are introduced in animal to human extrapolation and high to low dose extrapolation. Mathematical models are used by EPA to estimate the possible responses due to exposure to chemicals at levels far below those tested in animals. These models contain several limitations, which should be considered when the results (e.g., risk estimates) are evaluated. Primary among these limitations is the uncertainty in extrapolation of results obtained in animal research to humans and the shortcomings in extrapolating responses obtained from high-dose research studies to estimate responses at very low doses. For example, humans are typically exposed to environmental chemicals at levels that are less than a thousandth of the lowest dose tested in animals. Such doses may be easily degraded or eliminated by physiological internal mechanisms that are present in humans (Ames, 1987).

Additionally, approaches typically used for designating RfDs are highly conservative. For example, EPA (1989) applies a factor of 10 to a No-Observable-Adverse-Effect-Level (NOAEL) for a compound in an animal study for animal-to-human extrapolation. An additional factor of 10 is applied for inter-individual variation in the human population, and additional factors of 10 may be applied to account for limitations in data quality or incomplete studies. Frequently, RfDs are derived from animal studies that have little quantitative bearing on potential adverse effects in humans. Some of this uncertainty may be reduced if the absorption, distribution, metabolic fate, and excretion parameters of a compound are known.

Potential long-term, or chronic, exposures are typically evaluated in risk assessments for Superfund sites, and chronic RfDs and RfCs are the appropriate toxicity criteria to apply to chronic exposure scenarios (chronic exposure is defined in EPA, 1989 as greater than or equal to seven years). The BHHRA includes a construction worker scenario, which was assumed to be of a shorter duration than seven years and is, therefore, considered a subchronic exposure scenario. In some cases, EPA provides recommended subchronic RfDs which are typically 10 times higher than chronic values. Only chronic toxicity values were used in the risk assessment, which imparts conservatism in the construction worker scenario.

6.4 RISK CHARACTERIZATION UNCERTAINTIES

The only instance where uncertainty may have been introduced into the risk assessment that is not considered conservative was when toxicity values or screening criteria were not available. This was only an issue when evaluating impacts to off-site receptors since there are not inhalation toxicity values for many of the compounds (or TCEQ PCLs) and, as such, a comparison could not be made. It is believed that this is insignificant since: 1) there are few VOCs present in soil at the South Area; 2) the VOCs that are present were measured in low concentrations; and 3) surficial soil testing for lead on Lots 19 and 20 did not suggest that off-site migration via fugitive dust generation was a significant concern.

It was estimated that risks associated with VOC emissions from shallow Zone A groundwater to future inhabitants of buildings were above EPA's target risk goals. It should be noted that this is a highly uncertain pathway with the use of many default assumptions to calculate risks since currently the pathway is incomplete (i.e., there is no building or no worker at the Site 250 days per year for exposure to occur). Likewise, conservative assumptions were made about the slab and slab integrity and contaminant transport in the J&E VIM that would greatly affect the resulting risk estimates. Therefore, it is advisable to consider the results of this analysis in light of the substantial amount of uncertainty in the underlying assumptions of this pathway.

6.5 IMPACT OF UNCERTAINTIES

As described in this section, efforts were made in the BHHRA to purposefully err on the side of conservatism in the absence of site-specific information. It is believed that the overall impact of the uncertainty and conservative nature of the evaluation results in an overly protective assessment. Therefore, for scenarios with risks and HIs within or below the Superfund risk range goal and target HI, it can be said with confidence that these environmental media and areas do not present an unacceptable risk.

7.0 CONCLUSIONS

The primary objective of this BHHRA was to evaluate the possible risks associated with PCOCs in environmental media on human receptors at the Gulfco Marine Maintenance Site. This information will be used to help guide future risk management decisions at the Site. The risk assessment methodology used to conduct this analysis was based on the approach described by EPA in various supplemental and associated guidance documents as documented throughout the report.

Data were segregated by media and by location (e.g., North Area soil and South Area soil; Intracoastal Waterway sediment and wetlands sediment) and distribution testing was performed. Exposure point concentrations were estimated for all PCOCs for both central tendency (average) and RME (95% UCL) exposures using EPA's ProUCL program.

Five different exposure scenarios were quantitatively evaluated for the thirteen different potentially contaminated media identified at the Site. Exposure scenarios were developed to describe current and potential future land use by various human receptors and included a future industrial worker, future construction worker, current youth trespasser, current contact recreation receptor, and current off-site residential receptor. Exposure and risks were calculated for both central tendency and RME scenarios.

Based on the risk estimates and hazard indices shown in Table 28, there were not unacceptable cancer risk or noncancer hazard indices for any of the current or future exposure scenarios except for future exposure to an indoor industrial worker if a building is constructed over impacted groundwater in the North Area. Potential cancer risks in the North Area using maximum shallow Zone A groundwater concentrations and the J&E VIM were predicted to be greater than 1×10^{-4} while the HIs were estimated to be greater than 1. It should be noted that this scenario was evaluated despite the current restrictive covenant on Lots 55, 56, and 57 that require future building design to preclude vapor intrusion, which would effectively make this pathway incomplete. Estimated risks from Zone A groundwater at the South Area were below EPA's goals and, therefore, adverse risks associated with the vapor intrusion pathway are unlikely in this area.

8.0 REFERENCES

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TABLE 1
EXPOSURE POINT CONCENTRATIONS (mg/kg)
SOUTH AREA SURFACE SOIL*

Chemical of Interest[+]	Average	Max Detection	Min Detection	$^{Tot}Soil_{Comb}$ [(1)]	EPA Region 6 Soil Screening Criteria [(2)]		95% UCL	Statistic Used [(3)]	# of Detects/# of Samples
2-Methylnaphthalene	2.97E-02	5.01E-01	1.06E-02	2.48E+03	---		7.90E-02	97.5% KM (Chebyshev)	22 of 83
4,4'-DDD	3.07E-03	2.43E-02	2.64E-03	1.04E+02	1.10E+01	<	2.70E-04	median	5 of 83
4,4'-DDE	1.92E-03	6.93E-02	4.28E-04	7.32E+01	7.80E+00		7.52E-03	97.5% KM (Chebyshev)	17 of 83
4,4'-DDT	3.89E-03	6.25E-02	2.81E-04	6.84E+01	7.80E+00		1.03E-02	97.5% KM (Chebyshev)	37 of 83
Acenaphthene	6.08E-02	1.69E+00	1.13E-02	3.72E+04	3.30E+04		2.00E-01	97.5% KM (Chebyshev)	26 of 83
Acenaphthylene	4.55E-02	9.35E-01	1.84E-02	3.72E+04	---		1.21E-01	97.5% KM (Chebyshev)	19 of 83
Aluminum	**5.34E+03**	**1.52E+04**	**4.14E+02**	**5.70E+05**	**1.00E+05**		**5.95E+03**	**95% Student's-t**	**83 of 83**
Anthracene	9.71E-02	2.46E+00	1.12E-02	1.86E+05	1.00E+05		2.99E-01	97.5% KM (Chebyshev)	37 of 83
Antimony	1.65E+00	5.14E+00	2.00E-01	3.06E+02	4.50E+02		2.24E+00	97.5% KM (Chebyshev)	72 of 83
Aroclor-1254	**1.46E-01**	**7.98E+00**	**3.34E-03**	**7.10E+00**	**8.30E-01**		**7.64E-01**	**97.5% KM (Chebyshev)**	**13 of 85**
Arsenic	**3.74E+00**	**2.43E+01**	**2.60E-01**	**1.96E+02**	**1.80E+00**		**6.49E+00**	**97.5% KM (Chebyshev)**	**71 of 83**
Barium	3.45E+02	2.18E+03	1.86E+01	8.90E+04	7.90E+04		5.84E+02	97.5% KM (Chebyshev)	83 of 83
Benzo(a)anthracene	**3.57E-01**	**5.02E+00**	**2.86E-02**	**2.36E+01**	**2.30E+00**		**9.03E-01**	**97.5% KM (Chebyshev)**	**30 of 83**
Benzo(a)pyrene	**4.53E-01**	**4.57E+00**	**1.03E-02**	**2.37E+00**	**2.30E-01**		**1.09E+00**	**97.5% KM (Chebyshev)**	**65 of 83**
Benzo(b)fluoranthene	**5.88E-01**	**5.42E+00**	**4.08E-02**	**2.36E+01**	**2.30E+00**		**1.10E+00**	**95% KM (Chebyshev)**	**61 of 83**
Benzo(g,h,i)perylene	3.04E-01	4.24E+00	9.89E-03	1.86E+04	---		7.89E-01	97.5% KM (Chebyshev)	51 of 83
Benzo(k)fluoranthene	**2.44E-01**	**4.25E+00**	**1.95E-02**	**2.37E+02**	**2.30E+01**		**6.58E-01**	**97.5% KM (Chebyshev)**	**33 of 83**
Beryllium	4.08E-01	4.60E+00	1.40E-02	2.47E+02	2.20E+03		7.68E-01	97.5% KM (Chebyshev)	82 of 83
Boron	5.56E+00	5.44E+01	2.43E+00	1.90E+05	1.00E+05		7.07E+00	97.5% KM (Bootstrap)	34 of 83
Butyl Benzyl Phthalate	1.90E-02	2.97E-01	1.29E-02	1.00E+04	2.40E+02	<	1.25E-02	median	6 of 83
Cadmium	4.69E-01	9.71E+00	2.30E-02	8.52E+02	5.60E+02		1.25E+00	97.5% KM (Chebyshev)	50 of 83
Carbazole	6.20E-02	1.54E+00	1.04E-02	9.54E+02	9.60E+01		1.95E-01	97.5% KM (Chebyshev)	29 of 83
Chromium	**1.61E+01**	**1.36E+02**	**3.37E+00**	**5.71E+04**	**5.00E+02**		**2.68E+01**	**97.5% Chebyshev**	**83 of 83**
Chrysene	4.09E-01	4.87E+00	9.32E-03	2.36E+03	2.30E+02		9.84E-01	97.5% KM (Chebyshev)	56 of 83
Cobalt	3.71E+00	1.60E+01	4.90E-02	2.70E+02	2.10E+03		5.25E+00	97.5% KM (Chebyshev)	82 of 83
Copper	2.80E+01	2.16E+02	1.55E+00	3.69E+04	4.20E+04		5.22E+01	97.5% KM (Chebyshev)	83 of 83
Dibenz(a,h)anthracene	**1.87E-01**	**1.64E+00**	**6.39E-02**	**2.37E+00**	**2.30E-01**		**2.45E-01**	**95% KM (Bootstrap)**	**36 of 83**
Dibenzofuran	3.41E-02	8.21E-01	1.67E-02	2.73E+03	1.70E+03		7.23E-02	95% KM (BCA)	17 of 83
Dieldrin	**1.40E-03**	**2.05E-02**	**2.43E-04**	**1.14E+00**	**1.20E-01**		**3.14E-03**	**97.5% KM (Chebyshev)**	**21 of 83**
Di-n-butyl Phthalate	9.38E-02	7.53E-01	3.68E-02	1.62E+04	6.80E+04		1.25E-01	97.5% KM (Chebyshev)	9 of 83
Endosulfan Sulfate	2.09E-03	7.13E-02	4.56E-04	4.09E+03	---		4.21E-03	95% KM (BCA)	17 of 83
Endrin Aldehyde	8.82E-03	7.38E-02	4.97E-04	2.04E+02	---		8.72E-03	97.5% KM (Chebyshev)	22 of 83
Endrin Ketone	2.25E-03	2.00E-02	4.69E-04	1.77E+02	---		4.41E-03	97.5% KM (Chebyshev)	18 of 83
Fluoranthene	8.00E-01	1.42E+01	1.33E-02	2.48E+04	2.40E+04		2.14E+00	97.5% KM (Chebyshev)	59 of 83
Fluorene	5.18E-02	1.11E+00	9.45E-03	2.48E+04	2.60E+04		1.57E-01	97.5% KM (Chebyshev)	28 of 83
gamma-Chlordane	1.23E-03	1.56E-02	7.10E-04	5.10E+01	---		2.90E-03	97.5% KM (Chebyshev)	8 of 83
Indeno(1,2,3-cd)pyrene	**4.83E-01**	**6.49E+00**	**6.34E-02**	**2.37E+01**	**2.30E+00**		**9.31E-01**	**95% KM (Chebyshev)**	**63 of 83**
Iron	**1.63E+04**	**7.71E+04**	**3.45E+03**	**---**	**1.00E+05**		**2.40E+04**	**97.5% Chebyshev**	**83 of 83**
Lead	**6.96E+01**	**6.43E+02**	**2.82E+00**	**1.60E+03**	**8.00E+02**		**1.47E+02**	**97.5% Chebyshev**	**83 of 83**
Lithium	7.86E+00	2.80E+01	6.50E-01	1.90E+03	2.30E+04		1.18E+01	97.5% Chebyshev	83 of 83
Manganese	2.57E+02	8.92E+02	5.93E+01	2.41E+04	3.50E+04		2.81E+02	95% Student's-t	83 of 83
Mercury	**2.22E-02**	**6.60E-01**	**3.20E-03**	**3.26E+00**	**3.40E+02**		**7.42E-02**	**97.5% KM (Chebyshev)**	**37 of 83**
Molybdenum	1.32E+00	8.42E+00	9.80E-02	4.51E+03	5.70E+03		2.40E+00	97.5% KM (Chebyshev)	71 of 83
Nickel	1.16E+01	3.67E+01	2.84E+00	7.94E+03	2.30E+04		1.50E+01	97.5% KM (Chebyshev)	83 of 83
Phenanthrene	5.13E-01	1.26E+01	1.39E-02	1.86E+04	---		1.06E+04	97.5% KM (Chebyshev)	57 of 83
Pyrene	5.32E-01	8.47E+00	1.21E-02	1.86E+04	3.20E+04		1.36E+00	97.5% KM (Chebyshev)	57 of 83
Strontium	7.06E+01	5.27E+02	1.65E+01	4.91E+05	1.00E+05		1.01E+02	95% Chebyshev	83 of 83
Tin	8.06E-01	4.95E+00	5.20E-01	3.97E+05	---		1.31E+00	97.5% KM (Chebyshev)	23 of 83
Titanium	2.98E+01	6.45E+02	1.15E+01	1.00E+06	---		6.30E+01	95% Chebyshev	83 of 83
Vanadium	1.38E+01	4.56E+01	5.42E+00	2.29E+03	1.10E+03		1.80E+01	97.5% Chebyshev	83 of 83
Zinc	6.01E+02	4.77E+03	1.23E+01	2.45E+05	1.00E+05		1.06E+03	97.5% Chebyshev	81 of 83

Notes:
* Surface soil was collected from 0 to 0.5 ft. below ground surface.
[+] Chemicals of interest are any chemical measured in at least one sample at a frequency of detection greater than five percent. Bolded compounds have a maximum concentration that exceeded one-tenth of the screening value.
[(1)] - $^{Tot}Soil_{Comb}$ PCL = TCEQ protective concentration Level for 30 acre source area Commercial/Industrial total soil combined pathway (includes inhalation; ingestion; dermal pathways).
[(2)] - From EPA's "Region 6 Human Health Medium-Specific Screening Levels 2004-2005". Industrial Outdoor Worker.
[(3)] - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).

TABLE 2
EXPOSURE POINT CONCENTRATIONS (mg/kg)
SOUTH AREA SOIL*

Chemical of Interest^{+}	Average	Max Detection	Min Detection	$^{Tot}Soil_{Comb}$ [1]	EPA Region 6 Soil Screening Criteria [2]		95% UCL	Statistic Used [3]	# of Detects/# of Samples
1,3,5-Trimethylbenzene	9.89E-02	4.36E+00	2.67E-04	8.32E+01	7.80E+01		5.56E-01	97.5% KM (Chebyshev)	9 of 83
2-Butanone	3.29E-03	2.26E-02	9.92E-04	7.26E+04	3.40E+04		4.14E-03	95% KM (Bootstrap)	4 of 83
2-Hexanone	1.65E-03	2.07E-02	1.09E-03	7.92E+01	---		3.63E-02	97.5% KM (Chebyshev)	8 of 83
2-Methylnaphthalene	6.97E-02	7.21E+00	1.06E-02	2.48E+03	---		1.60E-01	95% KM (BCA)	32 of 166
4,4'-DDD	**7.76E-03**	**1.12E+00**	**3.69E-04**	**1.04E+02**	**1.10E+01**		**5.08E-02**	**97.5% KM (Chebyshev)**	**21 of 166**
4,4'-DDE	1.58E-03	6.93E-02	4.28E-04	7.32E+01	7.80E+00		2.81E-03	95% KM (BCA)	22 of 166
4,4'-DDT	3.75E-03	1.13E-01	2.81E-04	6.84E+01	7.80E+00		9.27E-03	97.5% KM (Chebyshev)	68 of 166
Acenaphthene	4.33E-02	1.69E+00	1.13E-02	3.72E+04	3.30E+04		1.16E-01	97.5% KM (Chebyshev)	35 of 166
Acenaphthylene	4.84E-02	1.20E+00	1.72E-02	3.72E+04	---		7.19E-02	95% KM (BCA)	37 of 166
Acetone	3.70E-02	1.60E-01	3.10E-02	8.11E+03	1.00E+05		5.41E-02	97.5% KM (Chebyshev)	10 of 83
Aluminum	**6.45E+03**	**1.57E+04**	**4.14E+02**	**5.70E+05**	**1.00E+05**		**8.20E+03**	**97.5% Chebyshev**	**166 of 166**
Anthracene	8.89E-02	2.46E+00	1.12E-02	1.86E+05	1.00E+05		1.24E-01	95% KM (BCA)	65 of 166
Antimony	1.45E+00	5.51E+00	2.00E-01	3.06E+02	4.50E+02		1.87E+00	97.5% KM (Chebyshev)	144 of 166
Aroclor-1254	**2.16E-01**	**1.15E+01**	**3.34E-03**	**7.10E+00**	**8.30E-01**		**7.73E-01**	**97.5% KM (Chebyshev)**	**25 of 170**
Arsenic	**3.33E+00**	**2.43E+01**	**2.30E-01**	**1.96E+02**	**1.80E+00**		**4.92E+00**	**97.5% KM (Chebyshev)**	**139 of 166**
Barium	2.37E+02	2.18E+03	1.86E+01	8.90E+04	7.90E+04		3.30E+02	95% Chebyshev	166 of 166
Benzene	3.89E-03	2.21E-02	3.39E-04	1.11E+02	1.60E+00		6.09E-03	97.5% KM (Chebyshev)	72 of 83
Benzo(a)anthracene	**2.69E-01**	**5.02E+00**	**1.18E-02**	**2.36E+01**	**2.30E+00**		**6.43E-01**	**97.5% KM (Chebyshev)**	**44 of 166**
Benzo(a)pyrene	**3.48E-01**	**4.88E+00**	**9.99E-03**	**2.37E+00**	**2.30E-01**		**7.63E-01**	**97.5% KM (Chebyshev)**	**113 of 166**
Benzo(b)fluoranthene	**4.77E-01**	**5.97E+00**	**4.08E-02**	**2.36E+01**	**2.30E+00**		**8.22E-01**	**95% KM (Chebyshev)**	**102 of 166**
Benzo(g,h,i)perylene	2.17E-01	4.24E+00	9.89E-03	1.86E+04	---		4.94E-01	97.5% KM (Chebyshev)	81 of 166
Benzo(k)fluoranthene	**1.58E-01**	**4.25E+00**	**1.58E-02**	**2.37E+02**	**2.30E+01**		**3.81E-01**	**97.5% KM (Chebyshev)**	**45 of 166**
Beryllium	4.65E-01	4.60E+00	1.40E-02	2.47E+02	2.20E+03		5.25E-01	95% KM (BCA)	165 of 166
Boron	5.68E+00	5.44E+01	2.43E+00	1.92E+05	1.00E+05		6.51E+00	95% KM (Bootstrap)	72 of 166
Butyl Benzyl Phthalate	2.01E-02	6.17E-01	1.29E-02	1.00E+04	2.40E+02		4.72E-02	97.5% KM (Chebyshev)	10 of 166
Cadmium	3.40E-01	9.71E+00	2.30E-02	8.52E+02	5.60E+02		4.67E-01	95% KM (Bootstrap)	93 of 166
Carbazole	4.64E-02	1.54E+00	1.04E-02	9.54E+02	9.60E+01		1.19E-01	97.5% KM (Chebyshev)	42 of 166
Carbon Disulfide	1.67E-03	2.80E-02	9.87E-04	7.19E+03	7.20E+02		3.92E-03	97.5% KM (Chebyshev)	13 of 83
Chromium	**1.35E+01**	**1.36E+02**	**2.03E+00**	**5.71E+04**	**5.00E+02**		**1.78E+01**	**95% Chebyshev**	**166 of 166**
Chrysene	3.28E-01	4.87E+00	9.01E-03	2.36E+03	2.30E+02		7.12E-01	97.5% KM (Chebyshev)	93 of 166
Cobalt	4.11E+00	1.60E+01	4.90E-02	2.70E+02	2.10E+03		4.35E+00	95% Winsor-t	165 of 166
Copper	2.43E+01	4.87E+02	1.30E-01	3.69E+04	4.20E+04		4.01E+01	95% KM (Chebyshev)	164 of 166
Cyclohexane	2.65E-01	2.17E+01	6.26E-04	4.20E+04	6.80E+03		1.91E+00	97.5% KM (Chebyshev)	47 of 83
Dibenz(a,h)anthracene	**1.48E-01**	**1.64E+00**	**6.19E-02**	**2.37E+00**	**2.30E-01**		**1.80E-01**	**95% KM (Bootstrap)**	**56 of 166**
Dibenzofuran	3.34E-02	8.21E-01	1.67E-02	2.73E+03	1.70E+03		7.31E-02	97.5% KM (Chebyshev)	23 of 166
Dieldrin	**8.89E-04**	**2.05E-02**	**2.43E-04**	**1.14E+00**	**1.20E-01**		**2.11E-03**	**97.5% KM (Chebyshev)**	**33 of 166**
Di-n-butyl Phthalate	4.18E-02	7.53E-01	3.11E-02	1.62E+04	6.80E+04		7.65E-02	97.5% KM (Chebyshev)	11 of 166
Endosulfan Sulfate	1.27E-03	7.13E-02	7.13E-02	4.09E+03	---		2.30E-03	95% KM (BCA)	21 of 166
Endrin Aldehyde	2.01E-03	7.38E-02	4.97E-04	2.04E+02	---		3.54E-03	95% KM (BCA)	31 of 166
Endrin Ketone	1.35E-03	2.00E-02	4.69E-04	1.77E+02	---		2.53E-03	97.5% KM (Chebyshev)	25 of 166
Ethylbenzene	3.40E-03	1.05E-01	6.54E-04	1.00E+04	2.30E+02		5.91E-03	95% KM (Bootstrap)	47 of 83
Fluoranthene	5.95E-01	1.42E+01	1.33E-02	2.48E+04	2.40E+04		1.41E+00	97.5% KM (Chebyshev)	96 of 166
Fluorene	4.44E-02	1.11E+00	9.45E-03	2.48E+04	2.60E+04		1.07E-01	97.5% KM (Chebyshev)	41 of 166
gamma-Chlordane	9.98E-04	1.56E-02	7.10E-04	5.10E+01	---		1.84E-03	97.5% KM (Chebyshev)	12 of 166
Indeno(1,2,3-cd)pyrene	**3.85E-01**	**6.49E+00**	**5.74E-02**	**2.37E+01**	**2.30E+00**		**6.58E-01**	**95% KM (Chebyshev)**	**104 of 166**
Iron	**1.43E+04**	**7.71E+04**	**2.41E+03**	**---**	**1.00E+05**		**1.75E+04**	**95% Chebyshev**	**166 of 166**
Isopropylbenzene (cumene)	**8.31E-01**	**6.49E+01**	**3.18E-04**	**6.25E+03**	**5.80E+02**		**5.85E+00**	**97.5% KM (Chebyshev)**	**16 of 83**
Lead	**5.35E+01**	**7.02E+02**	**2.48E+00**	**1.60E+03**	**8.00E+02**		**1.04E+02**	**97.5% Chebyshev**	**166 of 166**
Lithium	1.00E+01	2.86E+01	6.50E-01	1.90E+03	2.30E+04		1.22E+01	95% Chebyshev	166 of 166
m,p-Xylene	3.43E-02	2.56E+00	5.58E-04	6.50E+03	2.10E+02		1.69E-01	95% KM (Chebyshev)	53 of 83
Manganese	2.61E+02	8.92E+02	5.93E+01	2.41E+04	3.50E+04		2.78E+02	95% Student's-t	166 of 166
Mercury	**2.56E-02**	**8.50E-01**	**2.60E-03**	**3.26E+00**	**3.40E+02**		**4.00E-02**	**95%KM (BCA)**	**73 of 166**
Methylcyclohexane	3.66E-02	2.73E+00	2.23E-04	3.29E+04	1.40E+02		1.80E-01	95% KM (Chebyshev)	57 of 83
Molybdenum	9.05E-01	1.04E+01	8.80E-02	4.51E+03	5.70E+03		1.62E+00	97.5% KM (Chebyshev)	118 of 166
Naphthalene	**3.26E-01**	**1.92E+01**	**4.82E-03**	**1.90E+02**	**2.10E+02**	**<**	**2.65E-03**	**median**	**8 of 83**
Nickel	1.17E+01	3.67E+01	2.70E+00	7.94E+03	2.30E+04		1.24E+01	95% Student's-t	166 of 166
n-Propylbenzene	2.37E-02	1.80E+00	2.30E-04	4.10E+03	2.40E+02		1.63E-01	97.5% KM (Chebyshev)	14 of 83
o-Xylene	1.30E-02	8.40E-01	2.23E-04	8.00E+03	2.80E+02		7.75E-02	97.5% KM (Chebyshev)	32 of 83
Phenanthrene	4.02E-01	1.26E+01	1.36E-02	1.86E+04	---		9.99E-01	97.5% KM (Chebyshev)	95 of 166
Pyrene	4.32E-01	8.47E+00	1.21E-02	1.86E+04	3.20E+04		9.71E-01	97.5% KM (Chebyshev)	98 of 166
Strontium	7.56E+01	5.91E+02	1.65E+01	4.91E+05	1.00E+05		1.01E+02	95% Chebyshev	166 of 166
Tin	8.11E-01	6.48E+00	5.20E-01	3.97E+05	---		1.20E+00	97.5% KM (Chebyshev)	40 of 166
Titanium	2.58E+01	6.45E+02	4.02E+00	1.00E+06	---		3.22E+01	95% Student's-t	166 of 166
Toluene	3.99E-03	1.92E-02	7.21E-04	2.90E+04	5.20E+02		6.04E-03	97.5% KM (Chebyshev)	69 of 83
Vanadium	1.44E+01	4.56E+01	4.73E+00	2.29E+03	1.10E+03		1.73E+01	97.5% Chebyshev	166 of 166
Xylene (total)	4.73E-02	3.40E+00	7.77E-04	6.50E+03	2.10E+02		3.04E-01	97.5% KM (Chebyshev)	53 of 83
Zinc	4.34E+02	7.65E+03	6.17E+00	2.45E+05	1.00E+05		8.15E+02	97.5% Chebyshev	166 of 166

Notes:
* Soil was collected from 0 to 4 ft. below ground surface.
$^{+}$ Chemicals of interest are any chemical measured in at least one sample at a frequency of detection greater than five percent. Bolded compounds have a maximum concentration that exceeded one-tenth of the screening value.
(1) - $^{Tot}Soil_{Comb}$ PCL = TCEQ Protective Concentration Level for 30 acre source area Commercial/Industrial total soil combined pathway (includes inhalation; ingestion; dermal pathways).
(2) - From EPA's "Region 6 Human Health Medium-Specific Screening Levels 2004-2005". Industrial Outdoor Worker.
(3) - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).

TABLE 3
EXPOSURE POINT CONCENTATIONS (mg/L)
SOUTH AREA ZONE A GROUNDWATER

Chemical of Interest+	Average		RME EPC (1)	Notes:	# of Detects/# of Samples
1,1,1-Trichloroethane	1.85E-04		1.40E-03	RME EPC is max detect	1 of 13
1,1-Dichloroethane	2.10E-03		1.50E-02	RME EPC is max detect	3 of 13
2-Butanone	4.30E-04		3.00E-03	RME EPC is max detect	1 of 13
2-Methylnaphthalene	7.76E-04		8.80E-03	RME EPC is max detect	1 of 13
4,4'-DDE	3.34E-06		1.00E-05	RME EPC is max detect	1 of 13
Acetophenone	3.72E-03		4.60E-02	RME EPC is max detect	1 of 13
Acrylonitrile	1.00E-03		6.50E-03	RME EPC is max detect	1 of 13
Aluminum	7.13E-01		7.52E+00	RME EPC is max detect	7 of 13
Antimony	1.02E-02		4.30E-02	RME EPC is max detect	8 of 13
Arsenic	1.61E-02		5.70E-02	RME EPC is max detect	2 of 13
Barium	9.88E-02		2.20E-01	RME EPC is max detect	13 of 13
Benzene	4.25E-04		4.20E-03	RME EPC is max detect	1 of 13
Benzo(a)pyrene	1.06E-04		6.00E-04	RME EPC is max detect	1 of 13
Benzo(b)fluoranthene	3.26E-04		2.80E-03	RME EPC is max detect	1 of 13
Benzo(g,h,i)perylene	2.11E-04		1.60E-03	RME EPC is max detect	1 of 13
Benzoic Acid	8.40E-04		1.20E-03	RME EPC is max detect	8 of 13
Bis(2-ethylhexyl)Phthalate	1.46E-03		6.00E-04	RME EPC is max detect*	2 of 13
Boron	2.67E+00		4.04E+00	RME EPC is max detect	13 of 13
Carbazole	7.00E-04		8.40E-03	RME EPC is max detect	1 of 13
Carbon Disulfide	6.50E-05		3.00E-04	RME EPC is max detect	1 of 13
Chromium	5.53E-02		1.50E-01	RME EPC is max detect	13 of 13
Chrysene	1.93E-04		6.00E-04	RME EPC is max detect	1 of 13
cis-1,2-Dichloroethene	3.27E-03		3.00E-02	RME EPC is max detect	4 of 13
Cobalt	3.06E-03		8.90E-03	RME EPC is max detect	7 of 13
Cyclohexane	6.09E-04		6.80E-03	RME EPC is max detect	1 of 13
Dibenz(a,h)anthracene	2.90E-04		2.10E-03	RME EPC is max detect	1 of 13
Di-n-octyl Phthalate	2.08E-04		7.00E-04	RME EPC is max detect	1 of 13
Endosulfan II	5.61E-06		3.10E-05	RME EPC is max detect	1 of 14
Endosulfan Sulfate	8.57E-06		1.00E-04	RME EPC is max detect	1 of 14
Endrin Ketone	3.74E-06		2.30E-05	RME EPC is max detect	1 of 13
Fluorene	1.84E-04		1.00E-03	RME EPC is max detect	1 of 13
gamma-BHC (Lindane)	7.66E-06		4.20E-05	RME EPC is max detect	2 of 14
Heptachlor Epoxide	5.07E-06		2.01E-05	RME EPC is max detect	1 of 14
Indeno(1,2,3-cd)pyrene	2.92E-04		2.40E-03	RME EPC is max detect	1 of 13
Iron	6.39E+00		2.52E+01	RME EPC is max detect	13 of 13
Isopropylbenzene (Cumene)	1.78E-04		1.60E-03	RME EPC is max detect	1 of 13
Lithium	3.61E-01		6.60E-01	RME EPC is max detect	13 of 13
m,p-Cresol	1.10E-03		8.20E-03	RME EPC is max detect	1 of 13
Manganese	4.15E+00		1.28E+01	RME EPC is max detect	13 of 13
Molybdenum	2.30E-03		2.00E-03	RME EPC is max detect	1 of 13
MTBE	3.90E-03		3.20E-02	RME EPC is max detect	3 of 13
Nickel	7.40E-03		2.20E-02	RME EPC is max detect	10 of 14
o-Cresol	4.47E-04		4.40E-03	RME EPC is max detect	1 of 13
Phenanthrene	2.12E-04		1.60E-03	RME EPC is max detect	1 of 13
Selenium	9.08E-03		3.80E-02	RME EPC is max detect	2 of 13
Silver	7.38E-03		9.46E+00	RME EPC is max detect	12 of 13
Strontium	9.03E+00		1.71E+01	RME EPC is max detect	13 of 13
Thallium	2.00E-03		7.30E-03	RME EPC is max detect	1 of 13
Titanium	5.30E-03		3.10E-02	RME EPC is max detect	7 of 13
Vanadium	8.56E-03		2.30E-02	RME EPC is max detect	7 of 13
Vinyl Chloride	1.85E-04		1.90E-03	RME EPC is max detect	1 of 13

Notes:
*The maximum detected value is sometimes lower than the average since 1/2 of the reporting limit was used as a proxy value when it was not detected and because J flagged data (estimated) were used in the risk assessment.
+ Chemicals of interest are any chemical measured in at least one sample.
(1) RME EPC is the reasonable maximim exposure exposure point concentration.

TABLE 4
EXPOSURE POINT CONCENTRATIONS (mg/L)
INTRACOASTAL WATERWAY SURFACE WATER (TOTAL)

Chemical of Interest+	Average	Max Detection	Min Detection	$^{Tot}RW_{Comb}$ (1)	^{SW}RBELs Saltwater Fish Only (1)	RME EPC (2)	Statistic Used	# of Detects/# of Samples
Acrylonitrile	9.38E-04	2.10E-03	2.10E-03	7.57E-02	7.30E-03	2.10E-03	RME EPC is max detect	1 of 4
Aluminum	4.05E-01	5.50E-01	2.80E-01	4.03E+02	---	5.50E-01	RME EPC is max detect	4 of 4
Barium	2.40E-02	2.60E-02	2.20E-02	6.49E+01	---	2.60E-02	RME EPC is max detect	4 of 4
Boron	4.69E+00	4.81E+00	4.60E+00	7.44E+01	---	4.81E+00	RME EPC is max detect	4 of 4
Chromium	7.98E-02	1.20E-01	7.00E-02	1.26E+02	2.22E+00	1.20E-01	RME EPC is max detect	4 of 4
Copper	6.53E-03	1.10E-02	9.10E-03	3.31E+01	---	1.10E-02	RME EPC is max detect	2 of 4
Iron	4.63E-01	5.90E-01	3.20E-01	---	---	5.90E-01	RME EPC is max detect	4 of 4
Lithium	2.53E-01	2.70E-01	2.20E-01	1.65E+01	---	2.70E-01	RME EPC is max detect	4 of 4
Manganese	4.03E-02	4.80E-02	3.30E-02	4.09E+01	1.00E-01	4.80E-02	RME EPC is max detect	4 of 4
Silver	2.80E-03	3.70E-03	2.80E-03	1.57E+00	---	3.70E-03	RME EPC is max detect	3 of 4
Strontium	7.22E+00	7.35E+00	6.95E+00	3.38E+02	---	7.35E+00	RME EPC is max detect	4 of 4
Titanium	3.90E-03	5.70E-03	2.00E-03	8.67E+04	---	5.70E-03	RME EPC is max detect	4 of 4
Vanadium	4.25E-02	6.10E-02	3.50E-02	1.08E+00	---	6.10E-02	RME EPC is max detect	4 of 4

INTRACOASTAL WATERWAY SURFACE WATER (DISSOLVED METALS)

Chemicals of Interest+	Average	Max Detection	Min Detection	$^{Tot}RW_{Comb}$ (1)	^{SW}RBELs Saltwater Fish Only (1)	RME EPC	Statistic Used	# of Detects/# of Samples
Aluminum	6.48E-02	4.70E-02	4.70E-02	4.03E+02	---	4.70E-02	RME EPC is max detect	1 of 4
Barium	2.63E-02	2.80E-02	2.30E-02	6.49E+01	---	2.80E-02	RME EPC is max detect	4 of 4
Boron	4.79E+00	4.99E+00	4.30E+00	7.44E+01	---	4.99E+00	RME EPC is max detect	4 of 4
Lithium	2.10E-01	2.20E-01	2.00E-01	1.65E+01	---	2.20E-01	RME EPC is max detect	4 of 4
Manganese	4.85E-03	6.00E-03	2.50E-03	4.09E+01	1.00E-01	6.00E-03	RME EPC is max detect	4 of 4
Nickel	2.63E-03	3.30E-03	1.30E-03	1.13E+00	4.60E+00	3.30E-03	RME EPC is max detect	4 of 4
Selenium	4.25E-02	6.30E-02	2.80E-02	4.13E+00	4.20E+00	6.30E-02	RME EPC is max detect	4 of 4
Strontium	8.04E+00	8.47E+00	7.36E+00	3.38E+02	---	8.47E+00	RME EPC is max detect	4 of 4

Notes:
+ Chemicals of interest are any chemical measured in at least one sample.
(1) - TRRP 24. TCEQ, March 31, 2006.
(2) RME EPC is the reasonable maximim exposure exposure point concentration.

TABLE 5
EXPOSURE POINT CONCENTRATIONS (mg/L)
INTRACOASTAL WATERWAY BACKGROUND SURFACE WATER (TOTAL)

Chemical of Interest+	Average	Max Detection	Min Detection	$^{Tot}RW_{Comb}$ (1)	^{SW}RBELs Saltwater Fish Only (1)	RME EPC (2)	Statistic Used	# of Detects/# of Samples
4,4'-DDD	**3.30E-06**	**7.62E-06**	**3.60E-06**	**---**	**7.00E-06**	**7.62E-06**	**RME EPC is max detect**	**2 of 4**
4,4'-DDT	**4.93E-06**	**1.30E-05**	**1.30E-05**	**---**	**5.00E-06**	**1.30E-05**	**RME EPC is max detect**	**1 of 4**
Acetone	1.47E-03	4.52E-03	4.52E-03	7.80E+02	---	4.52E-03	RME EPC is max detect	1 of 4
Aldrin	**9.24E-06**	**1.10E-05**	**4.40E-06**	**---**	**2.80E-06**	**1.10E-05**	**RME EPC is max detect**	**4 of 4**
Aluminum	2.44E-01	4.00E-01	2.10E-01	4.03E+02	---	4.00E-01	RME EPC is max detect	4 of 4
Barium	1.96E-02	2.00E-02	2.00E-02	6.49E+01	---	2.00E-02	RME EPC is max detect	4 of 4
Benzo(g,h,i)perylene	1.20E-04	2.02E-04	2.02E-04	---	---	2.02E-04	RME EPC is max detect	1 of 4
Benzo(k)fluoranthene	**1.73E-04**	**3.11E-04**	**3.11E-04**	**---**	**1.80E-04**	**3.11E-04**	**RME EPC is max detect**	**1 of 4**
Bis(ethylhexyl) Phthalate	4.17E-03	1.97E-02	1.94E-02	---	2.20E-02	1.97E-02	RME EPC is max detect	2 of 4
Boron	4.38E+00	4.50E+00	4.27E+00	7.44E+01	---	4.50E+00	RME EPC is max detect	4 of 4
Chromium	7.84E-02	7.90E-02	7.80E-02	1.26E+02	2.22E+00	7.90E-02	RME EPC is max detect	4 of 4
Chromium VI	6.20E-03	1.10E-02	1.10E-02	2.43E-01	---	1.10E-02	RME EPC is max detect	1 of 4
Chrysene	1.61E-04	3.68E-04	3.68E-04	---	5.40E-03	3.68E-04	RME EPC is max detect	1 of 4
Di-n-butyl Phthalate	6.70E-04	1.42E-03	8.28E-04	4.49E+00	---	1.42E-03	RME EPC is max detect	2 of 4
Di-n-octyl Phthalate	2.65E-04	6.50E-04	6.50E-04	---	---	6.50E-04	RME EPC is max detect	1 of 4
Iron	3.40E-01	4.30E-01	3.40E-01	---	---	4.30E-01	RME EPC is max detect	4 of 4
Lithium	3.00E-01	3.40E-01	2.70E-01	1.65E+01	---	3.40E-01	RME EPC is max detect	4 of 4
Manganese	3.60E-02	4.10E-02	3.40E-02	4.09E+01	1.00E-01	4.10E-02	RME EPC is max detect	4 of 4
Methoxyclor	3.66E-06	1.40E-05	1.40E-05	7.19E-02	1.48E-03	1.40E-05	RME EPC is max detect	1 of 4
Molybdenum	2.72E-03	4.20E-03	1.80E-03	3.47E+00	---	4.20E-03	RME EPC is max detect	2 of 4
Silver	5.43E-03	5.90E-03	4.70E-03	1.57E+00	---	5.90E-03	RME EPC is max detect	4 of 4
Strontium	7.76E+00	8.31E+00	7.31E+00	3.38E+02	---	8.31E+00	RME EPC is max detect	4 of 4
Titanium	2.98E-03	4.20E-03	2.40E-03	8.67E+04	---	4.20E-03	RME EPC is max detect	4 of 4
Vanadium	4.14E-02	3.70E-02	1.10E-02	1.08E+00	---	3.70E-02	RME EPC is max detect	4 of 4

INTRACOASTAL WATERWAY BACKGROUND SURFACE WATER (DISSOLVED METALS)

Chemicals of Interest+	Average	Max Detection	Min Detection	$^{Tot}RW_{Comb}$ (1)	^{SW}RBELs Saltwater Fish Only (1)	RME EPC	Statistic Used	# of Detects/# of Samples
Barium	1.65E-02	1.90E-02	1.20E-02	6.49E+01	---	1.90E-02	RME EPC is max detect	4 of 4
Boron	3.98E+00	4.33E+00	3.04E+00	7.44E+01	---	4.33E+00	RME EPC is max detect	4 of 4
Chromium	7.38E-02	7.80E-02	6.40E-02	1.26E+02	2.22E+00	7.80E-02	RME EPC is max detect	4 of 4
Iron	5.40E-02	6.00E-02	6.00E-02	---	---	6.00E-02	RME EPC is max detect	1 of 4
Lithium	2.90E-01	3.90E-01	1.90E-01	1.65E+01	---	3.90E-01	RME EPC is max detect	4 of 4
Manganese	1.53E-02	1.80E-02	1.10E-02	4.09E+01	1.00E-01	1.80E-02	RME EPC is max detect	4 of 4
Molybdenum	3.68E-03	3.90E-03	3.90E-03	3.47E+00	---	3.90E-03	RME EPC is max detect	1 of 4
Silver	5.23E-03	5.80E-03	4.30E-03	1.57E+00	---	5.80E-03	RME EPC is max detect	4 of 4
Strontium	6.84E+00	7.46E+00	5.20E+00	3.38E+02	---	7.46E+00	RME EPC is max detect	4 of 4
Vanadium	1.23E-02	1.50E-02	9.30E-03	1.08E+00	---	1.50E-02	RME EPC is max detect	4 of 4

Notes:
+ Chemicals of interest are any chemical measured in at least one sample.
(1) - TRRP 24. TCEQ, March 31, 2006.
(2) RME EPC is the reasonable maximim exposure exposure point concentration.

TABLE 6
EXPOSURE POINT CONCENTRATIONS (mg/kg)
INTRACOASTAL WATERWAY SEDIMENT

Chemical of Interest[+]	Average	Max Detection	Min Detection	$^{Tot}Sed_{Comb}$ (1)		95% UCL	Statistic Used (2)	# of Detects/# of Samples
1,2-Dichloroethane	3.02E-03	3.02E-03	3.02E-03	6.0E+02	<	3.58E-04	median	1 of 16
1,2-Diphenylhydrazine/azobenzene	3.17E-02	3.17E-02	3.17E-02	1.3E+02	<	1.10E-02	median	1 of 16
2-Methylnaphthalene	1.88E-02	1.88E-02	1.88E-02	4.9E+02	<	1.46E-02	median	1 of 16
3,3'-Dichlorobenzidine	1.51E-01	1.51E-01	1.51E-01	3.2E+01	<	6.32E-02	median	1 of 16
4,4'-DDT	6.90E-04	3.32E-03	4.81E-04	8.7E+01	<	2.03E-04	median	4 of 17
4,6-Dinitro-2-methylphenol	6.27E-02	6.27E-02	6.27E-02	3.1E+02	<	2.64E-02	median	1 of 16
Acenaphthene	2.64E-02	6.31E-02	2.39E-02	7.4E+03	<	1.35E-02	median	2 of 16
Aluminum	6.85E+03	1.25E+04	3.90E+03	1.5E+05		7.88E+03	95% Student's-t	16 of 16
Anthracene	3.00E-02	7.53E-02	2.36E-02	3.7E+04	<	1.78E-02	median	6 of 16
Antimony	2.25E+00	8.14E+00	7.40E-01	8.3E+01		4.98E+00	97.5% Chebyshev	16 of 16
Arsenic	4.03E+00	7.62E+00	2.41E+00	1.1E+02		4.64E+00	95% Student's-t	16 of 16
Atrazine (Aatrex)	8.14E-02	8.14E-02	8.14E-02	6.4E+01	<	2.59E-02	median	1 of 16
Barium	2.15E+02	3.77E+02	1.16E+02	2.3E+04		3.08E+02	97.5% Chebyshev	16 of 16
Benzo(a)anthracene	9.54E-02	3.95E-01	6.75E-02	1.6E+01	<	1.38E-02	99% Chebyshev	3 of 16
Benzo(a)pyrene	**9.46E-02**	**4.45E-01**	**5.25E-02**	**1.6E+00**	**<**	**1.58E-02**	**median**	**6 of 16**
Benzo(b)fluoranthene	1.12E-01	6.11E-01	3.24E-02	1.6E+01		3.52E-01	97.5% KM (Chebyshev)	9 of 16
Benzo(g,h,i)perylene	7.19E-02	4.42E-01	1.73E-02	3.7E+03	<	1.72E-02	median	7 of 16
Benzo(k)fluoranthene	8.18E-02	3.18E-01	4.74E-02	1.6E+02	<	2.43E-01	median	6 of 16
Beryllium	4.63E-01	8.20E-01	2.90E-01	2.7E+01		5.28E-01	95% Student's-t	16 of 16
Boron	1.65E+01	2.72E+01	1.25E+01	1.1E+05		2.47E+01	97.5% KM (Chebyshev)	10 of 16
Butyl Benzyl Phthalate	2.02E-01	2.02E-01	2.02E-01	3.1E+04	<	1.65E-02	median	1 of 16
Carbazole	2.53E-02	8.61E-02	1.95E-02	7.1E+02	<	1.38E-02	median	3 of 16
Chloroform	5.05E-03	5.27E-03	5.04E-03	7.3E+03	<	4.42E-04	median	2 of 16
Chromium	9.21E+00	1.44E+01	5.01E+00	3.6E+04		1.04E+01	95% Student's-t	16 of 16
Chrysene	8.03E-02	4.75E-01	1.37E-02	1.6E+03		2.73E-01	97.5% KM (Chebyshev)	10 of 16
Cobalt	4.39E+00	7.16E+00	3.05E+00	3.2E+04		4.88E+00	95% Student's-t	16 of 16
Copper	7.11E+00	1.26E+01	3.28E+00	2.1E+04		8.43E+00	95% Student's-t	16 of 16
Cyclohexane	1.92E-03	1.92E-03	1.92E-03	1.0E+06	<	3.29E-03	median	1 of 16
Dibenz(a,h)anthracene	**7.12E-02**	**2.35E-01**	**5.11E-02**	**1.6E+00**	**<**	**1.57E-02**	**median**	**6 of 16**
Dibenzofuran	2.70E-02	3.05E-02	2.68E-02	6.1E+02	<	1.92E-02	median	2 of 16
Diethyl Phthalate	3.89E-02	3.89E-02	3.89E-02	1.2E+05	<	2.24E-02	median	1 of 16
Di-n-octyl Phthalate	2.58E-02	1.92E-01	1.47E-02	3.1E+03	<	1.13E-02	median	2 of 16
Fluoranthene	1.20E-01	8.04E-01	2.22E-02	4.9E+03		4.39E-01	97.5% KM (Chebyshev)	8 of 16
Fluorene	1.62E-02	4.60E-02	1.24E-02	4.9E+03	<	1.38E-02	median	4 of 16
gamma-Chlordane	6.54E-04	8.26E-04	6.38E-04	4.1E+01	<	3.91E-04	median	4 of 16
Hexachlorobenzene	3.19E-02	3.19E-02	3.19E-02	8.9E+00	<	1.62E-02	median	1 of 16
Indeno(1,2,3-cd)pyrene	9.99E-02	4.05E-01	5.56E-02	1.6E+01	<	2.53E-02	median	6 of 16
Iron	1.34E+04	2.82E+04	6.75E+03	---		2.20E+04	97.5% Chebyshev	16 of 16
Isopropylbenzene (cumene)	4.79E-03	7.04E-03	4.64E-03	7.3E+04	<	4.80E-04	median	2 of 16
Lead	1.16E+01	3.23E+01	5.00E+00	5.0E+02		2.27E+01	97.5% Chebyshev	16 of 16
Lithium	1.05E+01	2.00E+01	6.40E+00	1.1E+04		1.21E+01	95% Student's-t	16 of 16
Manganese	2.83E+02	4.74E+02	1.92E+02	1.4E+04		3.22E+02	95% Student's-t	16 of 16
Mercury	2.01E-02	3.60E-02	1.10E-02	3.4E+01		2.33E-02	95% Student's-t	16 of 16
Methylcyclohexane	3.70E-03	3.70E-03	3.70E-03	1.0E+06	<	1.70E-03	median	1 of 16
Molybdenum	6.67E-01	5.66E+00	1.40E-01	1.8E+03		2.15E+00	95% Chebyshev	16 of 16
Nickel	9.59E+00	1.67E+01	5.80E+00	1.4E+03		1.08E+01	95% Student's-t	16 of 16
n-Nitrosodiphenylamine	4.34E-02	4.34E-02	4.34E-02	9.0E+02	<	1.50E-02	median	1 of 16
Phenanthrene	8.58E-02	5.08E-01	3.11E-02	3.7E+03		2.80E-01	97.5% KM (Chebyshev)	8 of 16
Pyrene	1.33E-01	8.62E-01	1.76E-02	3.7E+03		4.82E-01	97.5% KM (Chebyshev)	10 of 16
Silver	3.35E-01	5.40E-01	3.00E-01	3.5E+02	<	8.95E-02	median	6 of 16
Strontium	4.49E+01	8.17E+01	3.28E+01	1.5E+05		5.12E+01	95% Student's-t	16 of 16
Titanium	2.56E+01	3.66E+01	1.91E+01	1.0E+06		2.78E+01	95% Student's-t	16 of 16
Toluene	5.81E-03	5.81E-03	5.81E-03	5.9E+04	<	1.73E-03	median	1 of 16
Vanadium	1.39E+01	2.12E+01	9.06E+00	3.3E+02		1.54E+01	95% Student's-t	16 of 16
Zinc	4.54E+01	9.26E+01	1.80E+01	7.6E+04		5.41E+01	95% Student's-t	16 of 16

Notes:

[+] Chemicals of interest are any chemical measured in at least one sample at a frequency of detection greater than five percent. Bolded compounds have a maximum concentration that exceeded one-tenth of the screening value.

(1) - From Tier 1 Sediment PCLs. TCEQ, March 31, 2006.

(2) - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).

TABLE 7
EXPOSURE POINT CONCENTATION (mg/kg)
INTRACOASTAL WATERWAY BACKGROUND SEDIMENT

Chemical of Interest+	Average	Max Detection	Min Detection	$^{Tot}Sed_{Comb}$ (1)		95% UCL	Statistic Used (2)	# of Detects/# of Samples
1,2,4-Trimethylbenzene	3.91E-03	3.91E-03	3.91E-03	3.7E+04	<	7.24E-04	median	1 of 9
1,4-Dichlorobenzene	4.11E-03	4.11E-03	4.11E-03	2.3E+03	<	1.54E-03	median	1 of 9
2-Butanone	2.08E-03	2.16E-03	2.00E-03	4.4E+05	<	2.00E-03	median	2 of 9
4,4'-DDT	5.70E-04	5.70E-04	5.70E-04	8.7E+01	<	2.10E-04	median	1 of 9
Aluminum	**1.22E+04**	**2.18E+04**	**4.73E+03**	**1.5E+05**		**1.65E+04**	**95% Student's-t**	**9 of 9**
Antimony	4.02E+00	7.33E+00	1.68E+00	8.3E+01		5.40E+00	95% Student's-t	9 of 9
Arsenic	5.81E+00	9.62E+00	2.36E+00	1.1E+02		7.74E+00	95% Student's-t	9 of 9
Barium	209.7.2	2.80E+02	1.11E+02	2.3E+04		2.39E+02	95% Student's-t	9 of 9
Benzo(b)fluoranthene	3.69E-02	3.69E-02	3.69E-02	1.6E+01	<	1.09E-02	median	1 of 9
Beryllium	7.66E-01	1.32E+00	3.20E-01	2.7E+01		1.02E+00	95% Student's-t	9 of 9
Boron	2.76E+01	4.79E+01	1.33E+01	1.1E+05		3.56E+01	95% Student's-t	9 of 9
Carbon Disulfide	5.91E-03	8.41E-03	3.41E-03	7.3E+04	<	8.40E-04	median	2 of 9
Chromium	1.28E+01	2.25E+01	5.81E+00	3.6E+04		1.69E+01	95% Student's-t	9 of 9
cis-1,2-Dichloroethene	2.84E-02	2.84E-02	2.84E-02	7.3E+03	<	4.61E-04	median	1 of 9
Cobalt	6.70E+00	1.18E+01	3.32E+00	3.2E+04		8.66E+00	95% Student's-t	9 of 9
Copper	8.14E+00	1.68E+01	2.68E+00	2.1E+04		1.13E+01	95% Student's-t	9 of 9
Iron	1.65E+04	2.79E+04	7.44E+03	---		2.15E+04	95% Student's-t	9 of 9
Lead	9.59E+00	1.45E+01	5.34E+00	5.0E+02		1.18E+01	95% Student's-t	9 of 9
Lithium	2.14E+01	4.46E+01	7.29E+00	1.1E+04		3.03E+01	95% Student's-t	9 of 9
Manganese	3.31E+02	4.42E+02	2.12E+02	1.4E+04		3.86E+02	95% Student's-t	9 of 9
Mercury	1.76E-02	5.00E-02	6.50E-03	3.4E+01		3.68E-02	95% Chebyshev	9 of 9
Molybdenum	2.41E-01	3.50E-01	1.60E-01	1.8E+03		2.83E-01	95% Student's-t	9 of 9
Nickel	1.49E+01	2.73E+01	6.31E+00	1.4E+03		1.99E+01	95% Student's-t	9 of 9
Strontium	5.92E+01	8.74E+01	3.48E+01	1.5E+05		7.28E+01	95% Student's-t	9 of 9
Titanium	3.18E+01	5.45E+01	2.11E+01	1.0E+06		3.83E+01	95% Student's-t	9 of 9
Trichloroethene	1.59E-02	1.59E-02	1.59E-02	4.4E+03	<	6.47E-04	median	1 of 9
Vanadium	**2.02E+01**	**3.42E+01**	**1.02E+01**	**3.3E+02**		**2.59E+01**	**95% Student's-t**	**9 of 9**
Xylene	3.35E-03	3.35E-03	3.35E-03	1.5E+05	<	2.09E-03	median	1 of 9
Zinc	3.60E+01	5.41E+01	1.93E+01	7.6E+04		4.45E+01	95% Student's-t	9 of 9

Notes:

+ Chemicals of interest are any chemical measured in at least one sample at a frequency of detection greater than five percent. Bolded compounds have a maximum concentration that exceeded one-tenth of the screening value.

(1) - From Tier 1 Sediment PCLs. TCEQ, March 31, 2006.

(2) - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A). When the compound was not detected in a given sample, one-half of the sample detection limit was used as the proxy concentration for that sample.

TABLE 8
EXPOSURE POINT CONCENTRATIONS (mg/kg)
NORTH AREA SURFACE SOIL*

Chemical of Interest+	Average	Max Detection	Min Detection	$^{Tot}Soil_{Comb}$ (1)	EPA Region 6 Soil Screening Criteria (2)		95% UCL	Statistic Used (3)	# of Detects/# of Samples
2-Methylnaphthalene	1.46E-02	5.30E-02	1.00E-02	2.48E+03	---	<	1.18E-02	median	3 of 18
4,4'-DDE	2.87E-03	1.49E-02	2.16E-03	7.32E+01	7.80E+00	<	4.24E-04	median	2 of 18
4,4'-DDT	1.50E-03	1.08E-02	5.97E-04	6.84E+01	7.80E+00	<	5.45E-04	median	7 of 18
Acenaphthene	2.86E-02	1.57E-01	2.10E-02	3.72E+04	3.30E+04	<	1.10E-02	median	2 of 18
Acenaphthylene	5.55E-02	5.55E-02	5.55E-02	3.72E+04	---	<	1.21E-02	median	1 of 18
Aluminum	**1.07E+04**	**1.68E+04**	**1.81E+03**	**5.70E+05**	**1.00E+05**		**1.22E+04**	**95% Student's-t**	**18 of 18**
Anthracene	2.69E-02	2.64E-01	8.87E-03	1.86E+05	1.00E+05	<	1.21E-02	median	4 of 18
Antimony	2.52E+00	8.09E+00	1.66E+00	3.06E+02	4.50E+02		4.95E+00	97.5% KM (Chebyshev)	9 of 18
Aroclor-1254	1.22E-02	1.22E-02	1.22E-02	7.10E+00	8.30E-01	<	4.29E-03	median	1 of 18
Arsenic	**2.53E+00**	**5.69E+00**	**5.40E-01**	**1.96E+02**	**1.80E+00**		**4.22E+00**	**97.5% KM (Chebyshev)**	**17 of 18**
Barium	1.45E+02	4.76E+02	4.61E+01	8.90E+04	7.90E+04		2.64E+02	95% Chebyshev	18 of 18
Benzo(a)anthracene	**1.18E+00**	**1.18E+00**	**1.18E+00**	**2.36E+01**	**2.30E+00**	**<**	**1.10E-02**	**median**	**1 of 18**
Benzo(a)pyrene	**1.19E-01**	**1.42E+00**	**1.35E-02**	**2.37E+00**	**2.30E-01**	**<**	**1.16E-02**	**median**	**7 of 18**
Benzo(b)fluoranthene	**1.69E-01**	**1.62E+00**	**4.87E-02**	**2.36E+01**	**2.30E+00**		**3.73E-01**	**95% KM (BCA)**	**8 of 18**
Benzo(g,h,i)perylene	1.40E-01	1.28E+00	2.37E-02	1.86E+04	---		5.92E-01	97.5% KM (Chebyshev)	10 of 18
Benzo(k)fluoranthene	1.13E-01	7.99E-01	1.10E-02	2.37E+02	2.30E+01	<	1.75E-02	median	4 of 18
Beryllium	7.11E-01	2.88E+00	6.60E-02	2.47E+02	2.20E+03		1.60E+00	97.5% KM (Chebyshev)	17 of 18
Bis(2-ethylhexyl)phthalate	4.45E-02	2.39E-01	1.22E-02	5.63E+02	1.40E+02	<	5.46E-02	median	6 of 18
Boron	8.74E+00	3.92E+01	3.15E+00	1.92E+05	1.00E+05		2.21E+01	97.5% KM (Chebyshev)	13 of 18
Butyl Benzyl Phthalate	1.51E-01	1.51E-01	1.51E-01	1.00E+04	2.40E+02	<	1.36E-02	median	1 of 18
Cadmium	3.58E-01	8.00E-01	2.80E-01	8.52E+02	5.60E+02		5.72E-01	97.5% KM (Chebyshev)	8 of 18
Carbazole	2.00E-02	1.28E-01	1.30E-02	9.54E+02	9.60E+01	<	1.11E-02	median	4 of 18
Chromium	**2.03E+01**	**1.28E+02**	**7.90E+00**	**5.71E+04**	**5.00E+02**		**4.86E+01**	**95% Chebyshev**	**18 of 18**
Chrysene	1.05E-01	1.30E+00	1.10E-02	2.36E+03	2.30E+02	<	1.03E-02	median	7 of 18
Cobalt	5.79E+00	7.87E+00	2.81E+00	2.70E+02	2.10E+03		6.41E+00	95% Student's-t	18 of 18
Copper	2.41E+01	2.00E+02	5.90E+00	3.69E+04	4.20E+04		7.00E+01	95% Chebyshev	18 of 18
Dibenz(a,h)anthracene	**7.69E-02**	**4.04E-01**	**4.50E-02**	**2.37E+00**	**2.30E-01**	**<**	**1.10E-02**	**median**	**4 of 18**
Dibenzofuran	8.62E-02	8.62E-02	8.62E-02	2.73E+03	1.70E+03	<	1.52E-02	median	1 of 18
Dieldrin	5.45E-03	5.45E-03	5.45E-03	1.14E+00	1.20E-01	<	1.83E-04	median	1 of 18
Diethyl Phthalate	1.10E-02	1.10E-02	1.10E-02	2.04E+03	1.00E+05	<	1.85E-02	median	1 of 18
Di-n-butyl Phthalate	1.00E-02	1.00E-02	1.00E-02	1.62E+04	6.80E+04	<	3.10E-02	median	1 of 18
Di-n-octyl Phthalate	2.14E-02	1.23E-01	1.54E-02	1.30E+04	2.70E+04	<	9.50E-03	median	2 of 18
Endrin	1.49E-03	1.49E-03	1.49E-03	1.27E+02	2.10E+02	<	2.22E-04	median	1 of 18
Endrin Ketone	9.66E-03	9.66E-03	9.66E-03	1.77E+02	---	<	5.48E-04	median	1 of 18
Fluoranthene	1.68E-01	2.19E+00	2.14E-02	2.48E+04	2.40E+04	<	1.28E-02	median	6 of 18
Fluorene	2.50E-02	1.41E-01	1.70E-02	2.48E+04	2.60E+04	<	1.09E-02	median	3 of 18
Indeno(1,2,3-cd)pyrene	**1.55E-01**	**1.51E+00**	**2.00E-02**	**2.37E+01**	**2.30E+00**		**6.82E-01**	**97.5% KM (Chebyshev)**	**9 of 18**
Iron	**1.95E+04**	**1.02E+05**	**8.45E+03**	**---**	**1.00E+05**		**4.11E+04**	**95% Chebyshev**	**18 of 18**
Lead	**5.77E+01**	**4.71E+02**	**8.22E+00**	**1.60E+03**	**8.00E+02**		**3.18E+02**	**99% Chebyshev**	**18 of 18**
Lithium	1.66E+01	2.66E+01	2.59E+00	1.90E+03	2.30E+04		1.87E+01	95% Student's-t	18 of 18
Manganese	3.70E+02	1.21E+03	8.23E+01	2.41E+04	3.50E+04		7.34E+02	97.5% KM (Chebyshev)	18 of 18
Mercury	1.38E-02	6.40E-02	6.00E-03	3.26E+00	3.40E+02		3.75E-02	97.5% KM (Chebyshev)	8 of 18
Molybdenum	9.66E-01	1.07E+01	8.50E-02	4.51E+03	5.70E+03		4.71E+00	97.5% KM (Chebyshev)	11 of 18
Nickel	1.70E+01	5.17E+01	1.17E+01	7.94E+03	2.30E+04		2.08E+01	95% Student's-t	18 of 18
Phenanthrene	1.15E-01	1.34E+00	1.80E-02	1.86E+04	---	<	1.42E-02	median	7 of 18
Pyrene	3.86E-01	1.87E+00	1.49E-02	1.86E+04	3.20E+04		2.03E+00	97.5% KM (Chebyshev)	8 of 18
Silver	1.10E-01	4.10E-01	9.20E-02	1.71E+03	5.70E+03	<	6.00E-02	median	2 of 18
Strontium	5.73E+01	9.36E+01	2.66E+01	4.91E+05	1.00E+05		6.54E+01	95% Student's-t	18 of 18
Thallium	6.30E-01	6.30E-01	6.30E-01	7.80E+01	---	<	1.00E-01	median	1 of 18
Tin	7.06E-01	3.67E+00	6.80E-01	3.97E+05	---	<	5.90E-01	median	4 of 18
Titanium	2.07E+01	5.59E+01	3.41E+00	1.00E+06	---		3.78E+01	97.5% KM (Chebyshev)	18 of 18
Vanadium	1.97E+01	4.58E+01	7.85E+00	2.29E+03	1.10E+03		2.34E+01	95% Student's-t	18 of 18
Zinc	4.18E+02	5.64E+03	2.95E+01	2.45E+05	1.00E+05		3.49E+03	99% Chebyshev	18 of 18

Notes:
* Surface soil was collected from 0 to 0.5 ft. below ground surface.
+ Chemicals of interest are any chemical measured in at least one sample at a frequency of detection greater than five percent. Bolded compounds have a maximum concentration that exceeded one-tenth of the screening value.
(1) - $^{Tot}Soil_{Comb}$ PCL = TCEQ Protective Concentration Level for 30 acre source area Commercial/Industrial total soil combined pathway (includes inhalation; ingestion; dermal pathways).
(2) - From EPA's "Region 6 Human Health Medium-Specific Screening Levels 2004-2005". Industrial Outdoor Worker.
(3) - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).

TABLE 9
EXPOSURE POINT CONCENTRATIONS (mg/kg)
NORTH AREA SOIL+

Chemical of Interest++	Average	Max Detection	Min Detection	$^{Tot}Soil_{Comb}$ (1)	EPA Region 6 Soil Screening Criteria (2)		95% UCL	Statistic Used (3)	# of Detects/# of Samples
1,1-Dichloroethane	2.67E-02	5.18E-01	1.61E-03	4.30E+03	2.30E+03	<	1.75E-04	median	3 of 19
1,1-Dichloroethene	1.73E-02	3.13E-01	1.78E-03	3.50E+03	4.70E+02	<	3.95E-04	median	2 of 19
1,2-Dichloroethane	**1.95E-02**	**1.77E-01**	**2.31E-03**	**1.15E+01**	**8.40E-01**	**<**	**1.27E-04**	**median**	**4 of 19**
2-Butanone	1.32E-02	2.08E-01	1.70E-03	7.26E+04	3.40E+04		7.87E-02	97.5% KM (Chebyshev)	11 of 19
2-Methylnaphthalene	4.05E-02	5.30E-02	1.00E-02	2.48E+03	---	<	1.19E-02	median	4 of 38
4,4'-DDE	2.50E-03	1.49E-02	2.16E-03	7.32E+01	7.80E+00	<	4.28E-04	median	2 of 38
4,4'-DDT	1.16E-02	1.08E-02	5.97E-04	6.84E+01	7.80E+00	<	7.94E-02	97.5% KM (Chebyshev)	7 of 38
Acenaphthene	1.99E-02	1.57E-01	2.10E-02	3.72E+04	3.30E+04	<	1.11E-02	median	4 of 38
Aluminum	**1.23E+04**	**1.83E+04**	**1.81E+03**	**5.70E+05**	**1.00E+05**		**1.33E+04**	**95% Student's-t**	**38 of 38**
Anthracene	2.90E-02	2.64E-01	8.87E-03	1.86E+05	1.00E+05		8.96E-02	97.5% KM (Chebyshev)	6 of 38
Antimony	1.45E+00	8.09E+00	1.66E+00	3.06E+02	4.50E+02		2.45E+00	95% KM (Bootstrap)	16 of 38
Aroclor-1254	**1.81E-01**	**9.38E-02**	**1.22E-02**	**7.10E+00**	**8.30E-01**	**<**	**4.30E-03**	**median**	**2 of 38**
Arsenic	**2.44E+00**	**5.69E+00**	**5.40E-01**	**1.96E+02**	**1.80E+00**		**3.82E+00**	**97.5% KM (Chebyshev)**	**32 of 38**
Barium	1.41E+02	3.62E+02	4.61E+01	8.90E+04	7.90E+04		2.34E+02	97.5% Chebyshev	38 of 38
Benzene	2.92E-03	6.32E-03	1.38E-03	1.11E+02	1.60E+00		5.39E-03	97.5% KM (Chebyshev)	12 of 18
Benzo(a)anthracene	**1.09E-01**	**1.18E+00**	**3.83E-02**	**2.36E+01**	**2.30E+00**	**<**	**1.11E-02**	**median**	**4 of 38**
Benzo(a)pyrene	**9.37E-02**	**1.42E+00**	**1.35E-02**	**2.37E+00**	**2.30E-01**		**3.78E-01**	**97.5% KM (Chebyshev)**	**10 of 38**
Benzo(b)fluoranthene	**1.44E-01**	**1.62E+00**	**4.87E-02**	**2.36E+01**	**2.30E+00**		**2.52E-01**	**95% KM (Bootstrap)**	**11 of 38**
Benzo(g,h,i)perylene	1.03E-01	1.28E+00	2.37E-02	1.86E+04	---		3.42E-01	97.5% KM (Chebyshev)	14 of 38
Benzo(k)fluoranthene	1.07E-01	7.99E-01	6.80E-02	2.37E+02	2.30E+01	<	1.72E-02	median	6 of 38
Beryllium	7.15E-01	2.88E+00	6.60E-02	2.47E+02	2.20E+03		1.18E+00	97.5% KM (Chebyshev)	35 of 38
Bis(2-ethylhexyl)phthalate	4.12E-02	2.39E-01	1.22E-02	5.63E+02	1.40E+02		9.96E-02	97.5% KM (Chebyshev)	11 of 38
Boron	7.64E+00	3.92E+01	3.14E+00	1.92E+05	1.00E+05		1.71E+01	97.5% KM (Chebyshev)	26 of 38
Bromoform	1.14E-02	1.80E-02	1.10E-02	6.04E+02	2.40E+02	<	1.86E-04	median	2 of 19
Butyl Benzyl Phthalate	5.66E-02	1.51E-01	5.40E-02	1.00E+04	2.40E+02	<	1.36E-02	median	2 of 38
Cadmium	3.63E-01	8.00E-01	2.80E-01	8.52E+02	5.60E+02		5.19E-01	97.5% KM (Chebyshev)	15 of 38
Carbazole	1.74E-02	1.28E-01	1.08E-02	9.54E+02	9.60E+01	<	1.10E-02	median	7 of 38
Carbon Disulfide	8.64E-03	2.84E-02	7.57E-03	7.19E+03	7.20E+02	<	1.19E-04	median	3 of 19
Chromium	**1.83E+01**	**1.28E+02**	**7.76E+00**	**5.70E+04**	**5.00E+02**		**3.21E+01**	**95% Chebyshev**	**38 of 38**
Chrysene	1.03E-01	1.30E+00	1.04E-02	2.40E+03	2.30E+02		3.84E-01	97.5% KM (Chebyshev)	11 of 38
cis-1,2-Dichloroethene	6.61E-02	9.99E-01	1.95E-02	4.70E+03	1.60E+02	<	1.38E-04	median	2 of 19
Cobalt	6.52E+00	1.03E+01	2.81E+00	2.70E+02	2.10E+03		7.04E+00	95% Student's-t	38 of 38
Copper	6.56E+01	2.00E+02	4.59E+00	3.70E+04	4.20E+04		5.12E+02	99% Chebyshev	38 of 38
Cyclohexane	1.13E-03	1.85E-03	9.81E-04	4.20E+04	6.80E+03	<	1.25E-03	median	5 of 19
Dibenz(a,h)anthracene	**6.88E-02**	**4.04E-01**	**4.50E-02**	**2.40E+00**	**2.30E-01**	**<**	**1.08E-02**	**median**	**7 of 38**
Dibenzofuran	1.96E-02	8.62E-02	1.50E-02	2.70E+03	1.70E+04	<	1.50E-02	median	2 of 38
Diethyl Phthalate	1.01E-02	1.10E-02	9.92E-03	2.04E+03	1.00E+05	<	1.85E-02	median	2 of 38
Di-n-butyl Phthalate	1.05E-02	1.50E-02	1.00E-02	1.62E+04	6.80E+04	<	3.07E-02	median	2 of 38
Di-n-octyl Phthalate	1.90E-02	1.23E-01	1.54E-02	1.30E+04	2.70E+04	<	9.52E-03	median	3 of 38
Ethylbenzene	2.69E-03	5.02E-03	1.14E-03	1.00E+04	2.30E+02	<	1.14E-03	median	5 of 19
Fluoranthene	1.44E-01	2.19E+00	2.14E-02	2.48E+04	2.40E+04	<	6.24E-01	97.5% KM (Chebyshev)	9 of 38
Fluorene	5.27E-02	1.41E-01	1.70E-02	2.48E+04	2.60E+04	<	3.92E-04	median	4 of 38
Indeno(1,2,3-cd)pyrene	**1.15E-01**	**1.51E+00**	**2.00E-02**	**2.37E+01**	**2.30E+00**		**3.96E-01**	**97.5% KM (Chebyshev)**	**13 of 38**
Iron	**2.09E+04**	**1.02E+05**	**7.12E+03**	**---**	**1.00E+05**		**3.69E+04**	**95% Chebyshev**	**38 of 38**
Lead	**5.30E+01**	**5.83E+00**	**6.30E+02**	**1.60E+03**	**8.00E+02**		**2.48E+02**	**99% Chebyshev**	**34 of 38**
Lithium	1.92E+01	3.22E+01	2.59E+00	1.90E+03	2.30E+04		2.08E+01	95% Student's-t	36 of 38
m,p-xylene	1.32E-03	1.39E-03	1.32E-03	6.50E+03	2.10E+02	<	4.22E-04	median	2 of 19
Manganese	3.87E+02	1.21E+03	8.23E+01	2.41E+04	3.50E+04		6.39E+02	97.5% Chebyshev	38 of 38
Mercury	1.43E-02	1.70E-01	3.40E-03	3.26E+00	3.40E+02		4.38E-02	97.5% KM (Chebyshev)	15 of 38
Methylcyclohexane	1.76E-03	2.78E-03	1.50E-03	3.29E+04	1.40E+02	<	1.54E-03	median	6 of 19
Molybdenum	1.40E-01	1.07E+01	8.50E-02	4.51E+03	5.70E+03		2.49E+00	97.5% KM (Chebyshev)	21 of 38
Naphthalene	3.24E+00	1.48E-01	1.30E-03	1.90E+02	2.10E+02	<	3.70E-03	median	6 of 19
Nickel	1.80E+01	5.17E+01	9.74E+00	7.94E+03	2.30E+04		2.01E+01	95% Student's-t	38 of 38
Phenanthrene	1.50E-01	1.83E+00	1.80E-02	1.86E+04	---		5.70E-01	97.5% KM (Chebyshev)	12 of 38
Pyrene	2.62E-01	4.64E+00	1.49E-02	1.86E+04	3.20E+04		1.12E+00	97.5% KM (Chebyshev)	14 of 38
Silver	1.05E-01	4.10E-01	9.20E-02	1.71E+03	5.70E+03	<	5.90E-02	median	3 of 38
Strontium	5.64E+01	9.62E+01	2.21E+01	4.91E+05	1.00E+05		6.20E+01	95% Student's-t	38 of 38
Tetrachloroethene	**1.26E-02**	**2.23E-01**	**1.35E-03**	**3.30E+02**	**1.70E+00**	**<**	**2.11E-04**	**median**	**3 of 19**
Tin	5.34E+00	3.67E+00	6.80E-01	3.97E+05	---	<	5.70E-01	median	5 of 38
Titanium	2.33E+01	5.70E+01	3.41E+00	1.00E+06	---		4.03E+01	97.5% Chebyshev	38 of 38
Toluene	3.24E-03	1.22E-02	1.34E-03	2.90E+04	5.20E+02		8.15E-03	97.5% KM (Chebyshev)	8 of 19
Vanadium	2.10E+01	4.58E+01	7.85E+00	2.29E+03	1.10E+03		2.33E+01	95% Student's-t	38 of 38
Xylene (total)	1.78E-01	1.76E+00	1.39E-03	6.50E+03	2.10E+02		8.58E-01	97.5% KM (Chebyshev)	8 of 19
Zinc	2.83E+02	5.64E+03	2.11E+01	2.45E+05	1.00E+05		1.78E+03	99% Chebyshev	38 of 38

Notes:
+ Soil was collected from 0 to 4 ft. below ground surface.
++ Chemicals of interest are any chemical measured in at least one sample at a frequency of detection greater than five percent. Bolded compounds have a maximum concentration that exceeded one-tenth of the screening value.
(1) - $^{Tot}Soil_{Comb}$ PCL = TCEQ Protective Concentration Level for 30 acre source area Commercial/Industrial total soil combined pathway (includes inhalation; ingestion; dermal pathways).
(2) - From EPA's "Region 6 Human Health Medium-Specific Screening Levels 2004-2005". Industrial Outdoor Worker.
(3) - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).

TABLE 10
EXPOSURE POINT CONCENTATIONS (mg/L)
NORTH AREA ZONE A GROUNDWATER

Chemical of Interest+	Average		RME EPC (1)	Notes:	# of Detects/# of Samples
1,1,1-Trichloroethane	1.48E+01		1.56E+02	RME EPC is max detect	5 of 16
1,1-Dichloroethane	2.80E+00		3.15E+01	RME EPC is max detect	5 of 12
1,1-Dichloroethene	3.46E+00		2.92E+01	RME EPC is max detect	6 of 16
1,2,3-Trichloropropane	6.17E+00		4.43E+01	RME EPC is max detect	5 of 16
1,2,4-Trimethylbenzene	3.80E-02		4.20E-02	RME EPC is max detect	1 of 12
1,2-Dichloroethane	2.42E+01		3.28E+02	RME EPC is max detect	6 of 16
1,2-Dichloropropane	4.90E-01		3.45E+00	RME EPC is max detect	4 of 16
2-Methylnaphthalene	2.70E-03		1.60E-02	RME EPC is max detect	2 of 12
4,4'-DDD	2.48E-06		1.90E-05	RME EPC is max detect	1 of 12
4,4'-DDE	2.14E-05		2.70E-04	RME EPC is max detect	2 of 12
4-Chloroaniline	1.50E-03		1.30E-02	RME EPC is max detect	1 of 12
4-Isopropyltoluene	2.30E-02		2.00E-03	RME EPC is max detect*	1 of 12
Acenaphthene	9.00E-04		8.60E-03	RME EPC is max detect	1 of 12
Acetone	2.81E-01		1.15E-01	RME EPC is max detect*	1 of 12
Acetophenone	6.80E-03		7.40E-02	RME EPC is max detect	1 of 12
alpha-BHC	1.96E-05		2.00E-04	RME EPC is max detect	1 of 12
Aluminum	8.18E-02		2.60E-01	RME EPC is max detect	5 of 12
Aniline	1.30E-03		1.10E-02	RME EPC is max detect	1 of 12
Anthracene	4.30E-04		1.40E-03	RME EPC is max detect	2 of 12
Antimony	1.98E-02		4.30E-02	RME EPC is max detect	11 of 12
Arsenic	1.13E-02		2.80E-02	RME EPC is max detect	2 of 12
Barium	1.64E-01		1.38E+00	RME EPC is max detect	12 of 12
Benzene	1.02E+00		8.24E+00	RME EPC is max detect	7 of 16
Benzo(b)fluoranthene	3.23E-04		1.40E-03	RME EPC is max detect	1 of 12
Benzo(g,h,i)perylene	2.89E-04		1.50E-03	RME EPC is max detect	1 of 12
Benzoic Acid	1.10E-03		1.40E-03	RME EPC is max detect	5 of 12
beta-BHC	1.09E-05		8.30E-05	RME EPC is max detect	2 of 12
Bis(2-ethylhexyl)Phthalate	3.70E-03		6.00E-04	RME EPC is max detect	1 of 12
Boron	2.20E+00		3.44E+00	RME EPC is max detect	12 of 12
Carbazole	2.20E-03		7.70E-03	RME EPC is max detect	3 of 12
Carbon Tetrachloride	5.60E-01		7.58E+00	RME EPC is max detect	1 of 16
Chromium	9.10E-02		1.60E-01	RME EPC is max detect	12 of 12
cis-1,2-Dichloroethene	8.96E+00		1.24E+02	RME EPC is max detect	6 of 16
Cobalt	2.60E-03		1.60E-02	RME EPC is max detect	3 of 12
delta-BHC	5.97E-06		4.10E-05	RME EPC is max detect	2 of 12
Dibenz(a,h)anthracene	4.87E-04		2.90E-03	RME EPC is max detect	1 of 12
Dibenzofuran	6.01E-04		4.90E-03	RME EPC is max detect	1 of 12
Dieldrin	5.01E-06		2.64E-05	RME EPC is max detect	1 of 16
Endosulfan II	1.29E-05		1.20E-04	RME EPC is max detect	6 of 17
Endosulfan Sulfate	2.46E-06		1.56E-05	RME EPC is max detect	1 of 12
Endrin Aldehyde	1.31E-05		1.30E-04	RME EPC is max detect	1 of 12
Ethylbenzene	9.69E-02		7.40E-01	RME EPC is max detect	1 of 13
Fluorene	8.51E-04		6.10E-03	RME EPC is max detect	3 of 12
gamma-BHC (Lindane)	1.25E-04		1.50E-03	RME EPC is max detect	3 of 16
Heptachlor Epoxide	5.44E-06		2.50E-05	RME EPC is max detect	1 of 12
Indeno(1,2,3-cd)pyrene	4.73E-04		3.30E-03	RME EPC is max detect	1 of 12
Iron	1.31E+01		3.66E+01	RME EPC is max detect	12 of 12
Isopropylbenzene (Cumene)	2.80E-02		3.80E-02	RME EPC is max detect*	2 of 12
Lithium	3.19E-01		6.70E-01	RME EPC is max detect	12 of 12
m,p-Cresol	2.78E-03		1.20E-02	RME EPC is max detect	3 of 12
m,p-Xylene	6.85E-02		1.68E-01	RME EPC is max detect	1 of 12
Manganese	7.74E+00		2.69E+01	RME EPC is max detect	12 of 12
Methylene Chloride	9.57E+01		1.23E+03	RME EPC is max detect	4 of 16
Molybdenum	7.20E-03		5.50E-02	RME EPC is max detect	1 of 12
Naphthalene	7.83E-02		3.22E-01	RME EPC is max detect	1 of 13
Nickel	1.99E-02		1.40E-01	RME EPC is max detect	7 of 14
n-Propylbenzene	3.60E-02		3.10E-02	RME EPC is max detect*	1 of 12
o-Cresol	1.40E-03		8.10E-03	RME EPC is max detect	2 of 12
o-Xylene	4.62E-02		4.40E-02	RME EPC is max detect*	1 of 12
Phenanthrene	8.31E-04		6.40E-03	RME EPC is max detect	2 of 13
Pyrene	2.23E-04		5.00E-04	RME EPC is max detect	1 of 13
Silver	9.14E-03		1.70E-02	RME EPC is max detect	12 of 12
Strontium	1.10E+01		1.88E+01	RME EPC is max detect	12 of 12
Styrene	2.60E-02		2.50E-03	RME EPC is max detect*	1 of 12
Tetrachloroethene	1.95E+00		2.05E+01	RME EPC is max detect	4 of 16
Thallium	4.60E-03		3.00E-02	RME EPC is max detect	2 of 12
Titanium	1.20E-03		3.30E-03	RME EPC is max detect	3 of 12
Toluene	3.35E-01		4.05E+00	RME EPC is max detect	4 of 16
Trichloroethene	1.15E+01		8.40E+01	RME EPC is max detect	7 of 16
Vanadium	8.40E-03		2.40E-02	RME EPC is max detect	6 of 12
Vinyl Chloride	5.02E-01		5.09E+00	RME EPC is max detect	3 of 16
Xylene (total)	1.15E-01		2.12E-01	RME EPC is max detect	1 of 12

Notes:
*The maximum detected value is sometimes lower than the average since 1/2 of the reporting limit was used as a proxy value when it was not detected and because J flag data were used in the risk assessment.
+ Chemicals of interest are any chemical measured in at least one sample.
(1) RME EPC is the reasonable maximim exposure exposure point concentration.

TABLE 11
EXPOSURE POINT CONCENTATIONS (mg/L)
WETLAND SURFACE WATER (TOTAL)

Chemical of Interest+	Average	Max Detection	Min Detection	$^{Tot}RW_{Comb}$ (1)	^{SW}RBELs Saltwater Fish Only (1)	RME EPC (2)	Statistic Used	# of Detects/# of Samples
1,2-Dichloroethane	2.30E-03	3.85E-03	2.55E-03	1.96E-01	4.93E-02	3.85E-03	RME EPC is max detect	3 of 4
Acrolein	1.21E-02	9.29E-03	9.29E-03	4.26E-01	2.90E-01	9.30E-03	RME EPC is max detect*	1 of 4
Aluminum	5.08E-01	8.00E-01	1.70E-01	4.03E+02	---	8.00E-01	RME EPC is max detect	4 of 4
Barium	2.20E-01	3.70E-01	1.50E-01	6.49E+01	---	3.70E-01	RME EPC is max detect	4 of 4
Boron	1.96E+00	2.42E+00	8.30E-01	7.44E+01	---	2.42E+00	RME EPC is max detect	4 of 4
Chromium	1.49E-02	3.70E-02	2.00E-02	1.26E+02	2.20E+00	3.70E-02	RME EPC is max detect	2 of 4
Chromium VI	3.13E-03	8.00E-03	8.00E-03	2.43E-01	---	8.00E-03	RME EPC is max detect	1 of 4
Copper	6.38E-03	1.10E-02	9.50E-03	3.31E+01	---	1.10E-02	RME EPC is max detect	2 of 4
Iron	6.45E-01	1.08E+00	1.90E-01	---	---	1.08E+00	RME EPC is max detect	4 of 4
Lithium	1.89E-01	2.50E-01	5.70E-02	1.65E+01	---	2.50E-01	RME EPC is max detect	4 of 4
Manganese	**1.37E-01**	**3.40E-01**	**1.80E-02**	**4.09E+01**	**1.00E-01**	**3.40E-01**	**RME EPC is max detect**	**4 of 4**
Mercury	**3.75E-05**	**7.00E-05**	**4.00E-05**	**9.73E-02**	**2.50E-05**	**7.00E-05**	**RME EPC is max detect**	**2 of 4**
Molybdenum	9.30E-03	1.50E-02	5.60E-03	3.47E+00	---	1.50E-02	RME EPC is max detect	3 of 4
Nickel	1.10E-03	2.20E-03	1.20E-03	1.13E+00	4.60E+00	2.20E-03	RME EPC is max detect	2 of 4
Strontium	5.27E+00	6.64E+00	1.87E+00	3.38E+02	---	6.64E+00	RME EPC is max detect	4 of 4
Titanium	6.40E-03	9.80E-03	2.40E-03	8.67E+04	---	9.80E-03	RME EPC is max detect	4 of 4
Zinc	7.30E-03	2.20E-02	2.20E-02	2.01E+02	2.60E+00	2.20E-02	RME EPC is max detect	1 of 4

WETLAND SURFACE WATER (DISSOLVED METALS)

Chemicals of Interest+	Average	Max Detection	Min Detection	$^{Tot}RW_{Comb}$ (1)	^{SW}RBELs Saltwater Fish Only (1)	RME EPC (2)	Statistic Used	# of Detects/# of Samples
Barium	3.20E-04	3.50E-01	1.40E-01	6.49E+01	---	3.50E-01	RME EPC is max detect	4 of 4
Boron	2.70E-02	2.75E+00	8.50E-01	7.44E+01	---	2.75E+00	RME EPC is max detect	4 of 4
Chromium	1.20E-03	3.70E-02	1.90E-02	1.26E+02	2.20E+00	3.70E-02	RME EPC is max detect	2 of 4
Copper	2.50E-03	1.10E-02	5.30E-03	3.31E+01	---	1.10E-02	RME EPC is max detect	3 of 4
Lithium	3.50E-03	2.80E-01	5.70E-02	1.65E+01	---	2.80E-01	RME EPC is max detect	4 of 4
Manganese	**6.00E-04**	**3.30E-01**	**2.50E-02**	**4.09E+01**	**1.00E-01**	**3.30E-01**	**RME EPC is max detect**	**4 of 4**
Molybdenum	2.70E-03	1.70E-02	5.40E-03	3.47E+00	---	1.70E-02	RME EPC is max detect	3 of 4
Nickel	4.50E-04	1.30E-03	4.90E-04	1.13E+00	4.60E+00	1.30E-03	RME EPC is max detect	2 of 4
Strontium	9.40E-04	7.01E+00	1.89E+00	3.38E+02	---	7.01E+00	RME EPC is max detect	4 of 4

Notes:
*The maximum detected value is sometimes lower than the average since 1/2 of the reporting limit was used as a proxy value when it was not detected, and because J flag data were used in the risk assessment.
+ Chemicals of interest are any chemical measured in at least one sample at a frequency of detection greater than five percent. Bolded compounds have a maximum concentration that exceeded one-tenth of the screening value.
(1) - TRRP 24. TCEQ, March 31, 2006.
(2) RME EPC is the reasonable maximim exposure exposure point concentration.

TABLE 12
EXPOSURE POINT CONCENTATIONS (mg/L)
POND SURFACE WATER (TOTAL)

Chemical of Interest$^+$	Average	Max Detection	Min Detection	$^{Tot}RW_{Comb}$ (1)	^{SW}RBELs Saltwater Fish Only (1)	RME EPC (2)	Statistic Used	# of Detects/# of Samples
4-Chloroaniline	2.79E-04	8.23E-04	8.23E-04	2.14E+00	NA	8.00E-04	RME EPC is max detect	1 of 6
Aluminum	9.13E-01	2.22E+00	4.10E-01	4.03E+02	NA	2.22E+00	RME EPC is max detect	5 of 6
Antimony	3.82E-03	7.60E-03	3.00E-03	1.99E-01	6.40E+00	7.60E-03	RME EPC is max detect	3 of 6
Arsenic	**5.40E-03**	**1.30E-02**	**1.20E-02**	**2.85E-02**	**1.40E-02**	**1.30E-02**	**RME EPC is max detect**	**2 of 6**
Barium	1.45E-01	1.90E-01	1.30E-01	6.49E+01	NA	1.90E-01	RME EPC is max detect	6 of 6
Benzo(a)pyrene	1.12E-04	3.48E-04	3.48E-04	---	5.40E-03	3.00E-04	RME EPC is max detect	1 of 6
Benzo(b)fluoranthene	4.03E-04	1.81E-03	1.81E-03	---	1.80E-03	1.80E-03	RME EPC is max detect	1 of 6
Benzo(g,h,i)perylene	3.71E-04	1.73E-03	1.73E-03	---	NA	1.70E-03	RME EPC is max detect	1 of 6
Benzo(k)fluoranthene	2.06E-04	5.42E-04	5.42E-04	---	1.80E-03	5.00E-04	RME EPC is max detect	1 of 6
Bis(2-ethylhexyl)phthalate	1.92E-02	4.00E-02	2.90E-02	---	2.20E-01	4.00E-02	RME EPC is max detect	3 of 6
Boron	2.97E+00	3.52E+00	2.45E+00	7.44E+01	NA	3.52E+00	RME EPC is max detect	6 of 6
Chromium	8.50E-04	1.50E-03	1.50E-03	1.26E+02	2.20E+01	1.50E-03	RME EPC is max detect	1 of 6
Chromium VI	8.50E-03	1.60E-02	1.50E-02	2.43E-01	NA	1.60E-02	RME EPC is max detect	2 of 6
Chrysene	2.48E-04	7.10E-04	7.10E-04	---	5.40E-02	7.00E-04	RME EPC is max detect	1 of 6
Cobalt	9.12E-04	3.20E-03	5.20E-04	5.33E+01	NA	3.20E-03	RME EPC is max detect	2 of 6
Dibenz(a,h)anthracene	**6.26E-04**	**3.04E-03**	**3.04E-03**	**---**	**1.80E-03**	**3.00E-03**	**RME EPC is max detect**	**1 of 6**
Di-n-butyl Phthalate	3.12E-03	3.81E-03	1.07E-03	4.49E+00	4.50E+01	3.80E-03	RME EPC is max detect	5 of 6
Indeno(1,2,3-cd)pyrene	**6.73E-04**	**3.44E-03**	**3.44E-03**	**---**	**1.80E-03**	**3.40E-03**	**RME EPC is max detect**	**1 of 6**
Iron	2.27E+00	6.67E+00	5.20E-01	---	NA	6.67E+00	RME EPC is max detect	6 of 6
Lead	2.63E-03	1.10E-02	1.10E-02	---	1.69E-01	1.10E-02	RME EPC is max detect	1 of 6
Lithium	1.16E-01	1.60E-01	6.70E-02	1.65E+01	NA	1.60E-01	RME EPC is max detect	6 of 6
Manganese	6.37E-01	1.44E+00	8.50E-02	4.09E+01	1.00E+00	1.44E+00	RME EPC is max detect	6 of 6
Molybdenum	8.73E-03	1.80E-02	1.30E-02	3.47E+00	NA	1.80E-02	RME EPC is max detect	3 of 6
Nickel	4.60E-03	7.90E-03	3.00E-03	1.13E+01	4.60E+01	7.90E-03	RME EPC is max detect	6 of 6
Selenium	4.26E-03	9.80E-03	9.80E-03	4.13E+00	4.20E+01	9.80E-03	RME EPC is max detect	1 of 6
Silver	9.30E-03	1.50E-02	3.70E-03	1.57E+00	NA	1.50E-02	RME EPC is max detect	6 of 6
Strontium	4.47E+00	7.19E+00	1.77E+00	3.38E+02	NA	7.19E+00	RME EPC is max detect	6 of 6
Thallium	**2.86E-03**	**7.70E-03**	**6.20E-03**	**6.61E-02**	**4.70E-03**	**7.70E-03**	**RME EPC is max detect**	**2 of 6**
Titanium	1.90E-02	4.40E-02	2.10E-03	8.67E+04	NA	4.40E-02	RME EPC is max detect	6 of 6
Vanadium	3.20E-03	8.40E-03	4.30E-03	1.08E+00	NA	8.40E-03	RME EPC is max detect	3 of 6
Zinc	1.20E-01	6.30E-01	2.70E-02	2.01E+02	2.60E+02	6.30E-01	RME EPC is max detect	3 of 6

POND SURFACE WATER (DISSOLVED METALS)

Chemicals of Interest$^+$	Average	Max Detection	Min Detection	$^{Tot}RW_{Comb}$ (1)	^{SW}RBELs Saltwater Fish Only (1)	RME EPC	Statistic Used	# of Detects/# of Samples
Antimony	3.50E-03	6.30E-03	3.10E-03	1.99E-01	6.40E+00	6.30E-03	RME EPC is max detect	3 of 6
Barium	1.25E-01	1.30E-01	1.20E-01	6.49E+01	NA	1.30E-01	RME EPC is max detect	6 of 6
Boron	2.79E+00	3.33E+00	2.36E+00	7.44E+01	---	3.33E+00	RME EPC is max detect	6 of 6
Lithium	1.45E-01	2.20E-01	8.00E-02	1.65E+01	NA	2.20E-01	RME EPC is max detect	6 of 6
Manganese	**4.65E-01**	**1.06E+00**	**6.60E-02**	**4.09E+01**	**1.00E+00**	**1.06E+00**	**RME EPC is max detect**	**6 of 6**
Molybdenum	1.01E-02	1.90E-02	1.80E-02	3.47E+00	NA	1.90E-02	RME EPC is max detect	3 of 6
Nickel	1.43E-03	2.60E-03	1.90E-03	1.13E+01	4.60E+01	2.60E-03	RME EPC is max detect	3 of 6
Silver	1.83E-03	2.90E-03	9.40E-04	1.57E+00	NA	2.90E-03	RME EPC is max detect	6 of 6
Strontium	4.32E+00	6.97E+00	1.78E+00	3.38E+02	NA	6.97E+00	RME EPC is max detect	6 of 6
Thallium	1.53E-03	3.20E-03	1.40E-03	6.61E-02	4.70E-03	3.20E-03	RME EPC is max detect	3 of 6
Vanadium	7.58E-04	2.10E-03	2.10E-03	1.08E+00	NA	2.10E-03	RME EPC is max detect	1 of 6

Notes:
*The maximum detected value is sometimes lower than the average since 1/2 of the reporting limit was used as a proxy value when it was not detected, and because J flag data were used in the risk assessment.
$^+$ Chemicals of interest are any chemical measured in at least one sample at a frequency of detection greater than five percent. Bolded compounds have a maximum concentration that exceeded one-tenth of the screening value.
(1) - TRRP 24. TCEQ, March 31, 2006.
(2) RME EPC is the reasonable maximim exposure exposure point concentration.

TABLE 13
EXPOSURE POINT CONCENTATIONS (mg/kg)
WETLAND SEDIMENT

Chemical of Interest[+]	Average	Max Detection	Min Detection	$^{Tot}Sed_{Comb}$ [1]		95% UCL	Statistic Used [2]	# of Detects/# of Samples
1,2-Dichloroethane	1.85E-03	2.40E-03	1.83E-03	6.0E+02	<	1.50E-04	median	3 of 48
2-Methylnaphthalene	2.25E-02	4.30E-01	1.22E-02	4.9E+02	<	1.20E-02	median	4 of 48
4,4'-DDT	1.39E-03	9.22E-03	9.29E-04	8.7E+01		2.52E-03	97.5% KM (Chebyshev)	16 of 55
Acenaphthene	2.13E-02	1.33E-01	1.60E-02	7.4E+03	<	1.11E-02	median	4 of 48
Acenaphthylene	4.88E-02	5.45E-01	2.91E-02	7.4E+03	<	1.27E-02	median	4 of 48
Aluminum	**1.32E+04**	**1.82E+04**	**3.40E+03**	**1.5E+05**		**1.40E+04**	**95% Student's-t**	**48 of 48**
Anthracene	2.99E-02	3.34E-01	8.38E-03	3.7E+04		9.70E-02	97.5% KM (Chebyshev)	8 of 48
Antimony[3]	1.24E+00	4.24E+00	4.60E-01	8.3E+01		1.80E+00	97.5% KM (Chebyshev)	40 of 48
Arsenic	**2.78E+00**	**1.28E+01**	**1.00E+00**	**1.1E+02**		**4.81E+00**	**97.5% KM (Chebyshev)**	**35 of 48**
Barium	1.52E+02	8.20E+02	3.60E+01	2.3E+04		2.38E+02	95% Chebyshev	48 of 48
Benzo(a)anthracene	9.20E-02	9.93E-01	5.46E-02	1.6E+01	<	1.14E-02	median	5 of 48
Benzo(a)pyrene	**1.10E-01**	**1.30E+00**	**1.76E-02**	**1.6E+00**		**3.47E-01**	**97.5% KM (Chebyshev)**	**15 of 48**
Benzo(b)fluoranthene	9.23E-02	1.36E+00	1.62E-02	1.6E+01		1.59E-01	95% KM (BCA)	19 of 48
Benzo(g,h,i)perylene	2.06E-01	1.94E+00	4.40E-02	3.7E+03		4.49E-01	95% KM (Chebyshev)	24 of 48
Benzo(k)fluoranthene	1.01E-01	7.30E-01	6.92E-02	1.6E+02		1.31E-01	95% KM (Bootstrap)	14 of 48
Beryllium	8.94E-01	1.37E+00	2.80E-01	2.7E+01		9.43E-01	95% Student's-t	48 of 48
Boron[3]	1.53E+01	4.62E+01	5.17E+00	1.1E+05		2.61E+01	97.5% KM (Chebyshev)	24 of 48
Cadmium	1.16E-01	4.80E-01	3.30E-02	1.1E+03		2.42E-01	97.5% KM (Chebyshev)	20 of 48
Carbazole	2.12E-02	1.41E-01	1.58E-02	7.1E+02	<	1.10E-02	median	5 of 48
Carbon Disulfide	3.48E-03	6.99E-03	3.34E-03	7.3E+04	<	1.40E-04	median	4 of 48
Chromium	1.51E+01	4.46E+01	8.96E+00	3.6E+04		1.64E+01	95% Student's-t	48 of 48
Chromium VI	1.63E+00	4.04E+00	1.30E+00	1.4E+02	<	5.67E-01	median	6 of 25
Chrysene	2.15E-01	4.05E+00	1.10E-02	1.6E+03		8.71E-01	97.5% KM (Chebyshev)	19 of 48
Cobalt	6.98E+00	9.89E+00	3.00E+00	3.2E+04		7.32E+00	95% Student's-t	48 of 48
Copper	1.45E+01	4.90E+01	5.44E+00	2.1E+04		2.21E+01	97.5% KM (Chebyshev)	48 of 48
Dibenz(a,h)anthracene	**2.87E-01**	**2.91E+00**	**1.29E-01**	**1.6E+00**	**<**	**3.75E-02**	**median**	**6 of 48**
Dibenzofuran	1.29E-02	8.00E-02	1.00E-02	6.1E+02	<	1.56E-02	median	3 of 48
Endosulfan Sulfate	8.46E-03	6.00E-02	7.31E-03	9.2E+02	<	4.40E-04	median	3 of 48
Endrin Aldehyde	1.28E-03	1.00E-02	5.66E-04	4.6E+01		3.32E-03	97.5% KM (Chebyshev)	9 of 48
Endrin Ketone	3.55E-03	1.30E-02	3.29E-03	4.6E+01	<	5.50E-04	median	3 of 48
Fluoranthene	1.04E-01	2.17E+00	1.20E-02	4.9E+03		4.46E-01	97.5% KM (Chebyshev)	13 of 48
Fluorene	2.17E-02	1.39E-01	1.50E-02	4.9E+03	<	1.10E-02	median	4 of 48
gamma-Chlordane	8.77E-04	3.60E-03	7.69E-04	4.1E+01	<	4.40E-04	median	4 of 48
Indeno(1,2,3-cd)pyrene	**2.20E-01**	**1.94E+00**	**6.28E-02**	**1.6E+01**		**3.17E-01**	**95% KM (BCA)**	**23 of 48**
Iron	1.72E+04	6.09E+04	1.11E+04	---		1.88E+04	95% Student's-t	48 of 48
Lead	**2.54E+01**	**2.37E+02**	**9.40E+00**	**5.0E+02**		**4.68E+01**	**95% Chebyshev**	**48 of 48**
Lithium	1.87E+01	2.76E+01	5.43E+00	1.1E+04		1.96E+01	95% Student's-t	48 of 48
Manganese	3.32E+02	1.01E+03	8.76E+01	1.4E+04		5.17E+02	97.5% Chebyshev	48 of 48
Mercury	2.04E-02	8.10E-02	6.10E-03	3.4E+01		3.80E-02	97.5% KM (Chebyshev)	26 of 48
Molybdenum	5.99E-01	3.24E+00	1.30E-01	1.8E+03		1.20E+00	97.5% KM (Chebyshev)	38 of 48
Nickel	1.73E+01	2.77E+01	1.09E+01	1.4E+03		1.81E+01	95% Student's-t	48 of 48
Phenanthrene	8.46E-02	1.30E+00	2.30E-02	3.7E+03		1.56E-01	95% KM (BCA)	12 of 48
Pyrene	1.52E-01	1.64E+00	1.59E-02	3.7E+03		4.77E-01	97.5% KM (Chebyshev)	19 of 48
Strontium	6.70E+01	3.30E+02	1.88E+01	1.5E+05		1.15E+02	97.5% KM (Chebyshev)	48 of 48
Tin[3]	6.38E-01	4.61E+00	3.45E+00	9.2E+04		1.26E+00	95% Chebyshev	4 of 48
Titanium	2.91E+01	6.87E+01	8.15E+00	1.0E+06		4.17E+01	97.5% Chebyshev	48 of 48
Toluene	1.58E-03	2.14E-03	1.57E-03	5.9E+04	<	7.30E-04	median	3 of 48
Vanadium	2.17E+01	3.20E+01	9.02E+00	3.3E+02		2.28E+01	95% Student's-t	48 of 48
Zinc	1.39E+02	9.03E+02	3.15E+01	7.6E+04		2.36E+02	95% Chebyshev	53 of 53

Notes:

[+] Chemicals of interest are any chemical measured in at least one sample at a frequency of detection greater than five percent. Bolded compounds have a maximum concentration that exceeded one-tenth of the screening value.

[1] - $^{Tot}Sed_{Comb}$ PCL = TCEQ Protective Concentration Level for total sediment combined pathway (includes inhalation; ingestion; dermal pathways).

[2] - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).

[3] - Samples 2WSED8, SWSED10, 4WSED2, and 4WSED3 were re-analyzed for antimony, boron, and tin because theinitial data indicated concentrations much higher than data for the rest of the samples although QA/QC indicated that they were acceptable. The re-analysis was run twice with good concurrence between the two re-analyses but with very different values from the original so the first re-analyzed value was used in the UCL calculation.

TABLE 14
EXPOSURE POINT CONCENTATIONS (mg/kg)
POND SEDIMENT

Chemical of Interest+	Average	Max Detection	Min Detection	$^{Tot}Sed_{Comb}$ (1)		RME EPC	Statistic Used (2)	# of Detects/# of Samples
2,4,6-Trichlorophenol	4.29E-02	4.29E-02	4.29E-02	1.3E+03	<	2.69E-02	median	1 of 8
4,4'-DDD	6.76E-04	6.76E-04	6.76E-04	1.2E+02	<	2.00E-02	median	1 of 8
4,4'-DDT	1.27E-03	1.57E-03	1.11E-03	8.7E+01	<	1.10E-02	median	3 of 8
Acetone	7.98E-02	7.98E-02	7.98E-02	6.6E+05	<	4.25E-02	median	1 of 8
Aluminum	**1.17E+04**	**1.63E+04**	**7.99E+03**	**1.5E+05**		**1.40E+04**	**95% Student's-t**	**8 of 8**
Antimony	1.41E+00	1.85E+00	3.30E-01	8.3E+01	<	4.40E-01	median	8 of 8
Arsenic	3.76E+00	5.01E+00	3.39E+00	1.1E+02	<	3.35E-01	median	3 of 8
Barium	1.99E+02	4.17E+02	1.08E+02	2.3E+04		3.83E+02	95% Chebyshev	8 of 8
Benzo(b)fluoranthene	5.37E-02	1.06E-01	2.93E-02	1.6E+01	<	3.38E-02	median	6 of 8
Benzo(g,h,i)perylene	1.35E-01	1.35E-01	1.35E-01	3.7E+03	<	1.59E-02	median	1 of 8
Benzo(k)fluoranthene	1.14E-01	1.30E-01	1.10E-01	1.6E+02	<	2.75E-02	median	3 of 8
Beryllium	8.34E-01	1.13E+00	5.80E-01	2.7E+01		9.72E-01	95% Student's-t	8 of 8
beta-BHC	6.99E-04	6.99E-04	6.99E-04	1.4E+01	<	2.30E-02	median	1 of 8
Boron	1.73E+01	2.84E+01	1.10E+01	1.1E+05	<	1.24E+01	median	5 of 8
Bromomethane	1.61E-02	3.10E-02	1.40E-02	1.0E+03	<	1.35E-02	median	2 of 8
Cadmium	2.13E-01	2.70E-01	1.90E-01	1.1E+03	<	1.90E-01	median	5 of 8
Carbon Disulfide	7.71E-03	7.71E-03	7.71E-03	7.3E+04	<	9.60E-04	median	1 of 8
Chromium	1.29E+01	2.01E+01	8.29E+00	3.6E+04		1.60E+01	95% Student's-t	8 of 8
Chrysene	2.57E-02	2.57E-02	2.57E-02	1.6E+03	<	1.40E-02	median	1 of 8
Cobalt	6.94E+00	8.99E+00	5.19E+00	3.2E+04		7.86E+00	95% Student's-t	8 of 8
Copper	1.52E+01	2.68E+01	8.33E+00	2.1E+04		2.02E+01	95% Student's-t	8 of 8
Iron	1.53E+04	2.01E+04	1.13E+04	---		1.74E+04	95% Student's-t	8 of 8
Lead	1.75E+01	3.05E+01	1.06E+01	5.0E+02		2.23E+01	95% Student's-t	8 of 8
Lithium	1.85E+01	2.37E+01	1.35E+01	1.1E+04		2.12E+01	95% Student's-t	8 of 8
m,p-Cresol	3.75E-02	3.75E-02	3.75E-02	---	<	2.34E-02	median	1 of 8
Manganese	4.88E+02	7.11E+02	3.52E+02	1.4E+04		5.71E+02	95% Student's-t	8 of 8
Methyl Iodide	4.10E-02	4.10E-02	4.10E-02	1.0E+03	<	7.84E-03	median	1 of 8
Molybdenum	2.59E-01	6.00E-01	2.10E-01	1.8E+03	<	1.20E-01	median	2 of 8
Nickel	1.63E+01	2.06E+01	1.23E+01	1.4E+03		1.84E+01	95% Student's-t	8 of 8
Pyrene	2.13E-02	2.65E-02	2.01E-02	3.7E+03	<	1.96E-02	median	3 of 8
Strontium	1.04E+02	1.81E+02	6.33E+01	1.5E+05		1.32E+02	95% Student's-t	8 of 8
Titanium	3.00E+01	4.05E+01	1.91E+01	1.0E+06		3.54E+01	95% Student's-t	8 of 8
Vanadium	2.18E+01	2.74E+01	1.68E+01	3.3E+02		2.46E+01	95% Student's-t	8 of 8
Zinc	3.32E+02	9.99E+02	3.82E+01	7.6E+04		9.61E+02	95% Chebyshev	8 of 8

Notes:

+ Chemicals of interest are any chemical measured in at least one sample at a frequency of detection greater than five percent. Bolded compounds have a maximum concentration that exceeded one-tenth of the screening value.

(1) - $^{Tot}Sed_{Comb}$ PCL = TCEQ Protective Concentration Level for total sediment combined pathway (includes inhalation; ingestion; dermal pathways).

(2) - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).

TABLE 15
EXPOSURE POINT CONCENTRATIONS (mg/kg)
BACKGROUND SOIL+

Chemical of Interest[++]	Average	Max Detection	Min Detection	$^{Tot}Soil_{Comb}$ [(1)]	EPA Region 6 Soil Screening Criteria[(2)]		95% UCL	Statistic Used [(3)]	# of Detects/# of Samples
Antimony	1.62E+00	2.19E+00	2.50E-01	3.06E+02	4.50E+02	<	8.90E-01	median	5 of 10
Arsenic	**3.44E+00**	**5.90E+00**	**2.40E-01**	**1.96E+02**	**1.80E+00**		**4.48E+00**	**95% Winsor's-t**	**10 of 10**
Barium	3.33E+02	1.13E+03	1.50E+02	8.90E+04	7.90E+04		9.02E+02	97.5% Chebyshev	10 of 10
Benzo(a)anthracene	8.20E-02	8.20E-02	8.20E-02	2.36E+01	2.30E+00	<	7.61E-03	median	1 of 10
Benzo(a)pyrene	**7.60E-02**	**7.60E-02**	**7.60E-02**	**2.37E+00**	**2.30E-01**	**<**	**1.00E-02**	**median**	**1 of 10**
Benzo(b)fluoranthene	5.70E-02	5.70E-02	5.70E-02	2.36E+01	2.30E+00	<	8.22E-03	median	1 of 10
Benzo(g,h,i)perylene	8.30E-02	8.30E-02	8.30E-02	1.86E+04	---	<	3.50E-02	median	1 of 10
Benzo(k)fluoranthene	1.06E-01	1.06E-01	1.06E-01	2.37E+02	2.30E+01	<	1.15E-02	median	1 of 10
Cadmium	8.30E-02	1.10E-01	4.10E-02	8.52E+02	5.60E+02	<	1.90E-02	median	3 of 10
Carbazole	1.10E-02	1.10E-02	1.10E-02	9.54E+02	9.60E+01	<	8.86E-03	median	1 of 10
Chromium	1.52E+01	2.01E+01	1.07E+01	5.70E+04	5.00E+02		1.70E+01	95% Student's-t	10 of 10
Chrysene	8.30E-02	8.30E-02	8.30E-02	2.40E+03	2.30E+02	<	1.40E-02	median	1 of 10
Copper	1.21E+01	1.93E+01	7.68E+00	3.70E+04	4.20E+04		1.44E+01	95% Student's-t	10 of 10
Fluoranthene	1.56E-01	1.56E-01	1.56E-01	2.48E+04	2.40E+04	<	1.15E-02	median	1 of 10
Indeno(1,2,3-cd)pyrene	**4.17E-01**	**4.17E-01**	**4.17E-01**	**2.37E+01**	**2.30E+00**	**<**	**2.95E-02**	**median**	**1 of 10**
Lead	1.34E+01	1.52E+01	1.10E+01	1.60E+03	8.00E+02		1.43E+01	95% Student's-t	10 of 10
Lithium	2.11E+01	3.25E+01	1.44E+01	1.90E+03	2.30E+04		2.41E+01	95% Student's-t	10 of 10
Manganese	3.77E+02	5.51E+02	2.84E+02	2.41E+04	3.50E+04		5.07E+02	95% Chebyshev	10 of 10
Mercury	2.13E-02	3.00E-02	1.50E-02	3.26E+00	3.40E+02		2.41E-02	95% Student's-t	10 of 10
Molybdenum	5.22E-01	6.80E-01	4.20E-01	4.51E+03	5.70E+03		5.65E-01	95% Student's-t	10 of 10
Phenanthrene	1.37E-01	1.37E-01	1.37E-01	1.86E+04	---	<	6.72E-03	median	1 of 10
Pyrene	1.27E-01	1.27E-01	1.27E-01	1.86E+04	3.20E+04	<	2.00E-02	median	1 of 10
Zinc	2.47E+02	9.69E+02	3.66E+01	2.45E+05	1.00E+05		7.50E+02	95% Chebyshev	10 of 10

Notes:
+ Soil was collected from 0 to 4 ft. below ground surface.
[++] Chemicals of interest are any chemical measured in at least one sample. Bolded compounds have a maximum concentration that exceeded one-tenth of the screening value.

[(1)] - $^{Tot}Soil_{Comb}$ PCL = TCEQ Protective Concentration Level for 30 acre source area Commercial/Industrial total soil combined pathway (includes inhalation; ingestion; dermal pathways).
[(2)] - From EPA's "Region 6 Human Health Medium-Specific Screening Levels 2004-2005". Industrial Outdoor Worker.
[(3)] - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).

TABLE 16
QUALITATIVE CURRENT OFF-SITE RESIDENTIAL RECEPTOR EVALUATION
SOUTH AREA SOIL*

Chemical of Interest+	Average	Max Detection	Min Detection	$^{Air}Soil_{Inh-VP}$ (1)	95% UCL	Statistic Used (3)	# of Detects/# of Samples
1,3,5-Trimethylbenzene	9.89E-02	4.36E+00	2.67E-04	6.00E+01	5.56E-01	97.5% KM (Chebyshev)	9 of 83
2-Butanone	3.29E-03	2.26E-02	9.92E-04	5.90E+04	4.14E-03	95% KM (Bootstrap)	4 of 83
2-Hexanone	1.65E-03	2.07E-02	1.09E-03	5.70E+01	3.63E-02	97.5% KM (Chebyshev)	8 of 83
2-Methylnaphthalene	6.97E-02	7.21E+00	1.06E-02	---	1.60E-01	95% KM (BCA)	32 of 166
4,4'-DDD	7.76E-03	1.12E+00	3.69E-04	---	5.08E-02	97.5% KM (Chebyshev)	21 of 166
4,4'-DDE	1.58E-03	6.93E-02	4.28E-04	---	2.81E-03	95% KM (BCA)	22 of 166
4,4'-DDT	3.75E-03	1.13E-01	2.81E-04	6.20E+02	9.27E-03	97.5% KM (Chebyshev)	68 of 166
Acenaphthene	4.33E-02	1.69E+00	1.13E-02	---	1.16E-01	97.5% KM (Chebyshev)	35 of 166
Acenaphthylene	4.84E-02	1.20E+00	1.72E-02	---	7.19E-02	95% KM (BCA)	37 of 166
Acetone	3.70E-02	1.60E-01	3.10E-02	5.80E+03	5.41E-02	97.5% KM (Chebyshev)	10 of 83
Aluminum	6.45E+03	1.57E+04	4.14E+02	2.60E+06	8.20E+03	97.5% Chebyshev	166 of 166
Anthracene	8.89E-02	2.46E+00	1.12E-02	---	1.24E-01	95% KM (BCA)	65 of 166
Antimony	1.45E+00	5.51E+00	2.00E-01	2.50E+05	1.87E+00	97.5% KM (Chebyshev)	144 of 166
Aroclor-1254	**2.16E-01**	**1.15E+01**	**3.34E-03**	**2.80E+00**	**7.73E-01**	**97.5% KM (Chebyshev)**	**25 of 170**
Arsenic	3.33E+00	2.43E+01	2.30E-01	2.70E+03	4.92E+00	97.5% KM (Chebyshev)	139 of 166
Barium	2.37E+02	2.18E+03	1.86E+01	2.50E+05	3.30E+02	95% Chebyshev	166 of 166
Benzene	3.89E-03	2.21E-02	3.39E-04	8.40E+01	6.09E-03	97.5% KM (Chebyshev)	72 of 83
Benzo(a)anthracene	2.69E-01	5.02E+00	1.18E-02	1.90E+03	6.43E-01	97.5% KM (Chebyshev)	44 of 166
Benzo(a)pyrene	3.48E-01	4.88E+00	9.99E-03	4.40E+02	7.63E-01	97.5% KM (Chebyshev)	113 of 166
Benzo(b)fluoranthene	4.77E-01	5.97E+00	4.08E-02	3.20E+03	8.22E-01	95% KM (Chebyshev)	102 of 166
Benzo(g,h,i)perylene	2.17E-01	4.24E+00	9.89E-03	---	4.94E-01	97.5% KM (Chebyshev)	81 of 166
Benzo(k)fluoranthene	1.58E-01	4.25E+00	1.58E-02	7.80E+04	3.81E-01	97.5% KM (Chebyshev)	45 of 166
Beryllium	4.65E-01	4.60E+00	1.40E-02	4.80E+03	5.25E-01	95% KM (BCA)	165 of 166
Boron	5.68E+00	5.44E+01	2.43E+00	1.00E+07	6.51E+00	95% KM (Bootstrap)	72 of 166
Butyl Benzyl Phthalate	2.01E-02	6.17E-01	1.29E-02	1.30E+04	4.72E-02	97.5% KM (Chebyshev)	10 of 166
Cadmium	3.40E-01	9.71E+00	2.30E-02	6.50E+03	4.67E-01	95% KM (Bootstrap)	93 of 166
Carbazole	4.64E-02	1.54E+00	1.04E-02	---	1.19E-01	97.5% KM (Chebyshev)	42 of 166
Carbon Disulfide	1.67E-03	2.80E-02	9.87E-04	5.50E+03	3.92E-03	97.5% KM (Chebyshev)	13 of 83
Chromium	1.35E+01	1.36E+02	2.03E+00	5.00E+04	1.78E+01	95% Chebyshev	166 of 166
Chrysene	3.28E-01	4.87E+00	9.01E-03	3.00E+05	7.12E-01	97.5% KM (Chebyshev)	93 of 166
Cobalt	4.11E+00	1.60E+01	4.90E-02	1.30E+03	4.35E+00	95% Winsor-t	165 of 166
Copper	2.43E+01	4.87E+02	1.30E-01	5.00E+05	4.01E+01	95% KM (Chebyshev)	164 of 166
Cyclohexane	2.65E-01	2.17E+01	6.26E-04	4.70E+04	1.91E+00	97.5% KM (Chebyshev)	47 of 83
Dibenz(a,h)anthracene	1.48E-01	1.64E+00	6.19E-02	1.00E+03	1.80E-01	95% KM (Bootstrap)	56 of 166
Dibenzofuran	3.34E-02	8.21E-01	1.67E-02	---	7.31E-02	97.5% KM (Chebyshev)	23 of 166
Dieldrin	8.89E-04	2.05E-02	2.43E-04	1.60E+01	2.11E-03	97.5% KM (Chebyshev)	33 of 166
Di-n-butyl Phthalate	4.18E-02	7.53E-01	3.11E-02	1.50E+04	7.65E-02	97.5% KM (Chebyshev)	11 of 166
Endosulfan Sulfate	1.27E-03	7.13E-02	7.13E-02	---	2.30E-03	95% KM (BCA)	21 of 166
Endrin Aldehyde	2.01E-03	7.38E-02	4.97E-04	---	3.54E-03	95% KM (BCA)	31 of 166
Endrin Ketone	1.35E-03	2.00E-02	4.69E-04	9.70E+02	2.53E-03	97.5% KM (Chebyshev)	25 of 166
Ethylbenzene	3.40E-03	1.05E-01	6.54E-04	7.90E+03	5.91E-03	95% KM (Bootstrap)	47 of 83
Fluoranthene	5.95E-01	1.42E+01	1.33E-02	---	1.41E+00	97.5% KM (Chebyshev)	96 of 166
Fluorene	4.44E-02	1.11E+00	9.45E-03	---	1.07E-01	97.5% KM (Chebyshev)	41 of 166
gamma-Chlordane	9.98E-04	1.56E-02	7.10E-04	5.00E+02	1.84E-03	97.5% KM (Chebyshev)	12 of 166
Indeno(1,2,3-cd)pyrene	3.85E-01	6.49E+00	5.74E-02	1.30E+04	6.58E-01	95% KM (Chebyshev)	104 of 166
Iron	1.43E+04	7.71E+04	2.41E+03	---	1.75E+04	95% Chebyshev	166 of 166
Isopropylbenzene (cumene)	8.31E-01	6.49E+01	3.18E-04	4.80E+03	5.85E+00	97.5% KM (Chebyshev)	16 of 83
Lead	5.35E+01	7.02E+02	2.48E+00	---	1.04E+02	97.5% Chebyshev	166 of 166
Lithium	1.00E+01	2.86E+01	6.50E-01	---	1.22E+01	95% Chebyshev	166 of 166
m,p-Xylene	3.43E-02	2.56E+00	5.58E-04	4.80E+03	1.69E-01	95% KM (Chebyshev)	53 of 83
Manganese	2.61E+02	8.92E+02	5.93E+01	2.50E+04	2.78E+02	95% Student's-t	166 of 166
Mercury	2.56E-02	8.50E-01	2.60E-03	2.40E+00	4.00E-02	95%KM (BCA)	73 of 166
Methylcyclohexane	3.66E-02	2.73E+00	2.23E-04	2.40E+04	1.80E-01	95% KM (Chebyshev)	57 of 83
Molybdenum	9.05E-01	1.04E+01	8.80E-02	2.50E+06	1.62E+00	97.5% KM (Chebyshev)	118 of 166
Naphthalene	**3.26E-01**	**1.92E+01**	**4.82E-03**	**1.40E+02**	**2.65E-03**	**median**	**8 of 83**
Nickel	1.17E+01	3.67E+01	2.70E+00	2.40E+04	1.24E+01	95% Student's-t	166 of 166
n-Propylbenzene	2.37E-02	1.80E+00	2.30E-04	3.30E+03	1.63E-01	97.5% KM (Chebyshev)	14 of 83
o-Xylene	1.30E-02	8.40E-01	2.23E-04	5.80E+03	7.75E-02	97.5% KM (Chebyshev)	32 of 83
Phenanthrene	4.02E-01	1.26E+01	1.36E-02	---	9.99E-01	97.5% KM (Chebyshev)	95 of 166
Pyrene	4.32E-01	8.47E+00	1.21E-02	---	9.71E-01	97.5% KM (Chebyshev)	98 of 166
Strontium	7.56E+01	5.91E+02	1.65E+01	---	1.01E+02	95% Chebyshev	166 of 166
Tin	8.11E-01	6.48E+00	5.20E-01	1.00E+07	1.20E+00	97.5% KM (Chebyshev)	40 of 166
Titanium	2.58E+01	6.45E+02	4.02E+00	---	3.22E+01	95% Student's-t	166 of 166
Toluene	3.99E-03	1.92E-02	7.21E-04	3.20E+04	6.04E-03	97.5% KM (Chebyshev)	69 of 83
Vanadium	1.44E+01	4.56E+01	4.73E+00	2.50E+04	1.73E+01	97.5% Chebyshev	166 of 166
Xylene (total)	4.73E-02	3.40E+00	7.77E-04	4.80E+03	3.04E-01	97.5% KM (Chebyshev)	53 of 83
Zinc	4.34E+02	7.65E+03	6.17E+00	---	8.15E+02	97.5% Chebyshev	166 of 166

Notes:
* Soil was collected from 0 to 4 ft. below ground surface.
+ Chemicals of interest are any chemical measured in at least one sample at a frequency of detection greater than five percent.
(1) - $^{Air}Soil_{Inh-VP}$ PCL = TCEQ protective concentration Level for 30 acre source area Residential soil-to-air pathway (inhalation of volatiles and particulates).
(2) - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).

TABLE 17
QUALITATIVE CURRENT OFF-SITE RESIDENTIAL RECEPTOR EVALUATION
NORTH AREA SOIL*

Chemical of Interest[++]	Average	Max Detection	Min Detection	$^{Air}Soil_{Inh-VP}$[(1)]	95% UCL	Statistic Used [(2)]	# of Detects/# of Samples
1,1-Dichloroethane	2.67E-02	5.18E-01	1.61E-03	3.20E+03	1.75E-04	median	3 of 19
1,1-Dichloroethene	1.73E-02	3.13E-01	1.78E-03	2.70E+03	3.95E-04	median	2 of 19
1,2-Dichloroethane	1.95E-02	1.77E-01	2.31E-03	7.10E+00	1.27E-04	median	4 of 19
2-Butanone	1.32E-02	2.08E-01	1.70E-03	5.90E+04	7.87E-02	97.5% KM (Chebyshev)	11 of 19
2-Methylnaphthalene	4.05E-02	5.30E-02	1.00E-02	---	1.19E-02	median	4 of 38
4,4'-DDE	2.50E-03	1.49E-02	2.16E-03	---	4.28E-04	median	2 of 38
4,4'-DDT	1.16E-02	1.08E-02	5.97E-04	6.20E+02	7.94E-02	97.5% KM (Chebyshev)	7 of 38
Acenaphthene	1.99E-02	1.57E-01	2.10E-02	---	1.11E-02	median	4 of 38
Aluminum	1.23E+04	1.83E+04	1.81E+03	2.60E+06	1.33E+04	95% Student's-t	38 of 38
Anthracene	2.90E-02	2.64E-01	8.87E-03	---	8.96E-02	97.5% KM (Chebyshev)	6 of 38
Antimony	1.45E+00	8.09E+00	1.66E+00	2.50E+05	2.45E+00	95% KM (Bootstrap)	16 of 38
Aroclor-1254	1.81E-01	9.38E-02	1.22E-02	2.80E+00	4.30E-03	median	2 of 38
Arsenic	2.44E+00	5.69E+00	5.40E-01	2.70E+03	3.82E+00	97.5% KM (Chebyshev)	32 of 38
Barium	1.41E+02	3.62E+02	4.61E+01	2.50E+05	2.34E+02	97.5% Chebyshev	38 of 38
Benzene	2.92E-03	6.32E-03	1.38E-03	8.40E+01	5.39E-03	97.5% KM (Chebyshev)	12 of 18
Benzo(a)anthracene	1.09E-01	1.18E+00	3.83E-02	1.90E+03	1.11E-02	median	4 of 38
Benzo(a)pyrene	9.37E-02	1.42E+00	1.35E-02	4.40E+02	3.78E-01	97.5% KM (Chebyshev)	10 of 38
Benzo(b)fluoranthene	1.44E-01	1.62E+00	4.87E-02	3.20E+03	2.52E-01	95% KM (Bootstrap)	11 of 38
Benzo(g,h,i)perylene	1.03E-01	1.28E+00	2.37E-02	---	3.42E-01	97.5% KM (Chebyshev)	14 of 38
Benzo(k)fluoranthene	1.07E-01	7.99E-01	6.80E-02	7.80E+04	1.72E-02	median	6 of 38
Beryllium	7.15E-01	2.88E+00	6.60E-02	4.80E+03	1.18E+00	97.5% KM (Chebyshev)	35 of 38
Bis(2-ethylhexyl)phthalate	4.12E-02	2.39E-01	1.22E-02	---	9.96E-02	97.5% KM (Chebyshev)	11 of 38
Boron	7.64E+00	3.92E+01	3.14E+00	1.00E+07	1.71E+01	97.5% KM (Chebyshev)	26 of 38
Bromoform	1.14E-02	1.80E-02	1.10E-02	4.30E+02	1.86E-04	median	2 of 19
Butyl Benzyl Phthalate	5.66E-02	1.51E-01	5.40E-02	1.30E+04	1.36E-02	median	2 of 38
Cadmium	3.63E-01	8.00E-01	2.80E-01	6.50E+03	5.19E-01	97.5% KM (Chebyshev)	15 of 38
Carbazole	1.74E-02	1.28E-01	1.08E-02	---	1.10E-02	median	7 of 38
Carbon Disulfide	8.64E-03	2.84E-02	7.57E-03	5.50E+03	1.19E-04	median	3 of 19
Chromium	1.83E+01	1.28E+02	7.76E+00	5.00E+04	3.21E+01	95% Chebyshev	38 of 38
Chrysene	1.03E-01	1.30E+00	1.04E-02	3.00E+05	3.84E-01	97.5% KM (Chebyshev)	11 of 38
cis-1,2-Dichloroethene	6.61E-02	9.99E-01	1.95E-02	6.30E+03	1.38E-04	median	2 of 19
Cobalt	6.52E+00	1.03E+01	2.81E+00	1.30E+03	7.04E+00	95% Student's-t	38 of 38
Copper	6.56E+01	2.00E+02	4.59E+00	5.00E+05	5.12E+02	99% Chebyshev	38 of 38
Cyclohexane	1.13E-03	1.85E-03	9.81E-04	4.70E+04	1.25E-03	median	5 of 19
Dibenz(a,h)anthracene	6.88E-02	4.04E-01	4.50E-02	1.00E+03	1.08E-02	median	7 of 38
Dibenzofuran	1.96E-02	8.62E-02	1.50E-02	---	1.50E-02	median	2 of 38
Diethyl Phthalate	1.01E-02	1.10E-02	9.92E-03	---	1.85E-02	median	2 of 38
Di-n-butyl Phthalate	1.05E-02	1.50E-02	1.00E-02	1.50E+04	3.07E-02	median	2 of 38
Di-n-octyl Phthalate	1.90E-02	1.23E-01	1.54E-02	---	9.52E-03	median	3 of 38
Ethylbenzene	2.69E-03	5.02E-03	1.14E-03	7.90E+03	1.14E-03	median	5 of 19
Fluoranthene	1.44E-01	2.19E+00	2.14E-02	---	6.24E-01	97.5% KM (Chebyshev)	9 of 38
Fluorene	5.27E-02	1.41E-01	1.70E-02	---	3.92E-04	median	4 of 38
Indeno(1,2,3-cd)pyrene	1.15E-01	1.51E+00	2.00E-02	1.30E+04	3.96E-01	97.5% KM (Chebyshev)	13 of 38
Iron	2.09E+04	1.02E+05	7.12E+03	---	3.69E+04	95% Chebyshev	38 of 38
Lead	5.30E+01	5.83E+00	6.30E+02	---	2.48E+02	99% Chebyshev	34 of 38
Lithium	1.92E+01	3.22E+01	2.59E+00	---	2.08E+01	95% Student's-t	36 of 38
m,p-xylene	1.32E-03	1.39E-03	1.32E-03	4.80E+03	4.22E-04	median	2 of 19
Manganese	3.87E+02	1.21E+03	8.23E+01	2.50E+04	6.39E+02	97.5% Chebyshev	38 of 38
Mercury	1.43E-02	1.70E-01	3.40E-03	2.40E+00	4.38E-02	97.5% KM (Chebyshev)	15 of 38
Methylcyclohexane	1.76E-03	2.78E-03	1.50E-03	2.40E+04	1.54E-03	median	6 of 19
Molybdenum	1.40E-01	1.07E+01	8.50E-02	2.50E+06	2.49E+00	97.5% KM (Chebyshev)	21 of 38
Naphthalene	3.24E+00	1.48E-01	1.30E-03	1.40E+02	3.70E-03	median	6 of 19
Nickel	1.80E+01	5.17E+01	9.74E+00	2.40E+04	2.01E+01	95% Student's-t	38 of 38
Phenanthrene	1.50E-01	1.83E+00	1.80E-02	---	5.70E-01	97.5% KM (Chebyshev)	12 of 38
Pyrene	2.62E-01	4.64E+00	1.49E-02	---	1.12E+00	97.5% KM (Chebyshev)	14 of 38
Silver	1.05E-01	4.10E-01	9.20E-02	5.00E+03	5.90E-02	median	3 of 38
Strontium	5.64E+01	9.62E+01	2.21E+01	---	6.20E+01	95% Student's-t	38 of 38
Tetrachloroethene	1.26E-02	2.23E-01	1.35E-03	4.80E+02	2.11E-04	median	3 of 19
Tin	5.34E+00	3.67E+00	6.80E-01	1.00E+07	5.70E-01	median	5 of 38
Titanium	2.33E+01	5.70E+01	3.41E+00	---	4.03E+01	97.5% Chebyshev	38 of 38
Toluene	3.24E-03	1.22E-02	1.34E-03	3.20E+04	8.15E-03	97.5% KM (Chebyshev)	8 of 19
Vanadium	2.10E+01	4.58E+01	7.85E+00	2.50E+04	2.33E+01	95% Student's-t	38 of 38
Xylene (total)	1.78E-01	1.76E+00	1.39E-03	4.80E+03	8.58E-01	97.5% KM (Chebyshev)	8 of 19
Zinc	2.83E+02	5.64E+03	2.11E+01	---	1.78E+03	99% Chebyshev	38 of 38

Notes:
+ Soil was collected from 0 to 4 ft. below ground surface.
[++] Chemicals of interest are any chemical measured in at least one sample at a frequency of detection greater than five percent. Bolded compounds have a maximum concentration that exceeded the screening value.
[(1)] - $^{Air}Soil_{Inh-VP}$ PCL = TCEQ protective concentration Level for 30 acre source area Residential soil-to-air pathway (inhalation of volatiles and particulates).

[(2)] - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).

TABLE 18
BACKGROUND COMPARISONS

HYPOTHESIS TESTED: ARE SITE DATA STATISTICALLY DIFFERENT THAN BACKGROUND DATA?[1]							
CHEMICAL OF INTEREST	**SOUTH AREA SURFACE SOIL**	**SOUTH AREA SOIL**	**NORTH AREA SURFACE SOIL**	**NORTH AREA SOIL**	**INTRACOASTAL WATERWAY SEDIMENT**	**WETLANDS SEDIMENT**	**POND SEDIMENT**
Aluminum	NA	NA	NA	NA	Yes*	NA	NA
Antimony	No	No	No	No	Yes*	No	No
Arsenic	No	No	No	No	Yes*	No	Yes*
Barium	No	No	Yes*	Yes*	No	Yes*	No
Beryllium	NA	NA	NA	NA	Yes*	NA	NA
Boron	NA	NA	NA	NA	Yes*	NA	NA
Cadmium	No	No	**Yes**	Yes*	NA	**Yes**	**Yes**
Chromium	No	No	No	No	NA	No	No
Cobalt	NA	NA	NA	NA	Yes*	NA	NA
Copper	**Yes**	No	No	No	No	No	No
Iron	NA	NA	NA	NA	No	NA	No
Lead	**Yes**	No	No	No	No	No	**Yes**
Lithium	Yes*	Yes*	Yes*	No	Yes*	No	No
Manganese	Yes*	Yes*	No	No	No	No	**Yes**
Mercury	No	No	Yes*	Yes*	No	No	NA
Molybdenum	**Yes**	No	No	No	No	No	Yes*
Nickel	NA	NA	NA	NA	No	NA	NA
Strontium	NA	NA	NA	NA	Yes*	NA	NA
Titanium	NA	NA	NA	NA	Yes*	NA	NA
Vanadium	NA	NA	NA	NA	Yes*	NA	NA
Zinc	**Yes**	No	No	No	No	No	No

Notes:
[1] Detailed statistical procedures are outlined in Section 2.2.2 and calculations are provided in Appendix B.
* Statistical difference is due to background being greater than site.
NA - No analysis was performed for compound in background.

TABLE 19
PCOCS IDENTIFIED AND QUANTITATIVELY EVALUATED IN THE BHHRA*

SOUTH AREA SOIL**	NORTH AREA SOIL**	INTRACOASTAL WATERWAY SURFACE WATER	INTRACOASTAL WATERWAY SEDIMENT	WETLANDS SURFACE WATER	WETLANDS SEDIMENT	POND SURFACE WATER	POND SEDIMENT
4,4'-DDD Aluminum Aroclor-1254 Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Dibenz(a,h)anthracene Dieldrin Indeno(1,2,3-cd)pyrene Iron Isopropylbenzene (cumene) Lead Naphthalene	1,2-Dichloroethane Aluminium Aroclor-1254 Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Dibenz(a,h)anthracene Indeno(1,2,3-cd)pyrene Iron Tetrachloroethene	none+	Benzo(a)pyrene Dibenz(a,h)anthracene Iron	none+	Aluminum Benzo(a)pyrene Dibenz(a,h)anthracene Indeno(1,2,3-cd)pyrene Iron	none+	Aluminum Iron m,p-Cresol

Notes:
* Groundwater was not included in the table because all compounds measured in groundwater were evaluated quantitatively in the BHHRA.
** Soil includes both surface and subsurface soil for the purposes of this table.
+ All COIs for surface water screened out, as discussed in Section 2.2.1.

TABLE 20
EVALUATION OF EXPOSURE PATHWAYS

PATHWAY NAME	POTENTIAL CONTAMINANTS OF CONCERN	SOURCE	POTENTIAL EXPOSURE MEDIA	POTENTIAL POINT OF EXPOSURE	POTENTIALLY EXPOSED POPULATION*	POTENTIAL ROUTE OF EXPOSURE	COMMENTS
South Area Soil	4,4'-DDD, Aluminum, Aroclor-1254, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenz(a,h)anthracene, Dieldrin, Indeno(1,2,3-cd)pyrene, Iron, Isopropylbenzene (cumene), Lead, Naphthalene	Site Operations	Soil	On-site	Industrial Worker, Construction Worker, Youth Trespasser	Incidental ingestion and dermal contact	Pathways quantitatively evaluated in BHHRA.
			Air	On-site	Industrial Worker, Construction Worker, Youth Trespasser	Inhalation of VOCs and particulates	Pathways quantitatively evaluated in BHHRA.
			Air	Off-site	Off-Site Resident	Inhalation of VOCs and particulates	Pathway screened out as described in Section 2.2.
South Area Groundwater	VOCs	Site Operations	Soil Gas to Indoor Air	On-site	Industrial Worker (future only)	Inhalation of vapors intruding from groundwater	Pathway quantitatively evaluated in BHHRA.
North Area Soil	1,2-Dichloroethane, Aluminum, Aroclor-1254, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Iron, Tetrachloroethene	Site Operations	Soil	On-site	Industrial Worker, Construction Worker, Youth Trespasser	Incidental ingestion and dermal contact	Pathways quantitatively evaluated in BHHRA.
			Air	On-site and Off-site	Industrial Worker, Construction Worker, Youth Trespasser	Inhalation of VOCs and particulates	Pathways quantitatively evaluated in BHHRA.
			Air	Off-site	Off-Site Resident	Inhalation of VOCs and particulates	Pathway screened out as described in Section 2.2.
North Area Groundwater	VOCs	Surface Impoundment	Soil Gas to Indoor Air	On-site	Industrial Worker (future only)	Inhalation of vapors intruding from groundwater	Pathway quantitatively evaluated in BHHRA.
Intracoastal Waterway Sediment	Benzo(a)pyrene, Dibenz(a,h)anthracene, Iron	Runoff from Site	Sediment	Off-site	Contact Recreation	Incidental ingestion and dermal contact	Pathways quantitatively evaluated in BHHRA.
			Fish Uptake	Off-site	Recreational Fisherman	Fish ingestion	Quantitatively evaluated in fish tissue risk assessment.
Intracoastal Waterway Surface Water	COIs screened out as described in Section 2.2.	Runoff from Site	Surface Water	Off-site	Contact Recreation	Incidental ingestion and dermal contact	Pathway screened out as described in Section 2.2.
			Fish Uptake	Off-site	Recreational Fisherman	Fish ingestion	Quantitatively evaluated in fish tissue risk assessment.
North Wetlands Sediment	Aluminum, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Iron	Runoff from Site	Sediment	On-site and Off-site	Contact Recreation	Incidental ingestion and dermal contact	Pathways quantitatively evaluated in BHHRA.
North Wetlands Surface Water	COIs screened out as described in Section 2.2.	Runoff from Site	Surface Water	On-site and Off-site	Contact Recreation	Incidental ingestion and dermal contact	Pathway screened out as described in Section 2.2.
Pond Sediment	Aluminum, Iron, m,p-Cresol	Runoff from Site	Sediment	On-site	Contact Recreation	Incidental ingestion and dermal contact	Pathways quantitatively evaluated in BHHRA.
Pond Surface Water	COIs screened out as described in Section 2.2.	Runoff from Site	Surface Water	On-site	Contact Recreation	Incidental ingestion and dermal contact	Pathway screened out as described in Section 2.2.

Notes:
Unless otherwise noted, the timeframe considered was current and future exposure.

TABLE 21
EXPOSURE SCENARIOS BY MEDIA

MEDIA	Future On-Site Industrial Worker Receptor	Future On-Site Construction Worker Receptor	Potential Current Youth Trespasser	Potential Current Contact Recreation	Potential Current Off-Site Residential Receptor
South Area Surface Soil	X (1)	X (1)	X (1)		X (2)
South Area Soil	X (1)	X (1)	X (1)		X (3)
South Area Groundwater	X (6)				
Intracoastal Waterway Surface Water				X (4)	
Intracoastal Waterway Sediment				X (5)	
Intracoastal Waterway Fish					X*
North Area Surface Soil	X (1)	X (1)	X (1)		
North Area Soil	X (1)	X (1)	X (1)		
North Area Groundwater	X (7)				
North Area Wetlands Surface Water		X+	X (12)	X (8)	
North Area Wetlands Sediment		X+	X (12)	X (9)	
North Area Ponds Surface Water		X+	X (12)	X (10)	
North Area Ponds Sediment		X+	X (12)	X (11)	

Notes:
* EPA-approved fish ingestion pathway risk assessment (PBW, 2007) concluded that this pathway does not pose a human health threat.
+ Exposure for this receptor was not quantified since exposure would be approximately four times less than the acceptable risk calculated for the contact recreation receptor.
due to the less exposure incurred for the worker given the differences in exposure frequency and duration.
(1) Risks presented in Table 23.
(2) Risks presented in Table 24.
(3) Risks presented in Table 25.
(4) Screening evaluation presented in Table 4.
(5) Screening evaluation presented in Table 6.
(6) Risks presented in Table 26.
(7) Risks presented in Table 27.
(8) Screening evaluation presented in Table 11.
(9) Screening evaluation presented in Table 13.
(10) Screening evaluation presented in Table 12.
(11) Screening evaluation presented in Table 14.
(12) Trespasser risks were assumed to be equivalent to the contact recreation receptor.

TABLE 22
EXPOSURE ASSUMPTIONS FOR THE INDUSTRIAL WORKER SCENARIO

PARAMETER	DEFINITION	AVERAGE VALUE	REFERENCE	RME VALUE	REFERENCE
PEF	Particulate Emission Factor (m^3/kg)	1.00E+09	EPA, 2004a	1.00E+09	EPA, 2004a
IR	Ingestion rate of soil (mg/day)	50	EPA, 2004a	50	EPA, 2004a
SA	Skin surface area (cm2)	3300	EPA, 2004a	3300	EPA, 2004a
AF	Soil to skin adherence factor (mg/cm2)	0.021	EPA, 2001a	0.2	EPA, 2004a
EF	Exposure frequency (day/yr)	250	EPA, 2004a	250	EPA, 2004a
ED	Exposure duration (yr)	25	EPA, 2004a	25	EPA, 2004a
BW	Body weight (kg)	70	EPA, 1989	70	EPA, 1989
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	9125	EPA, 1989	9125	EPA, 1989

TABLE 23
EXPOSURE ASSUMPTIONS FOR THE CONSTRUCTION WORKER SCENARIO

PARAMETER	DEFINITION	AVERAGE VALUE	REFERENCE	RME VALUE	REFERENCE
PEF	Particulate Emission Factor (m^3/kg)	1.00E+09	EPA, 2004a	1.00E+09	EPA, 2004a
IR	Ingestion rate of soil (mg/day)	165	professional judgment	330	EPA, 2001
SA	Skin surface area (cm2)	3300	EPA, 2004a	3300	EPA, 2004a
AF	Soil to skin adherence factor (mg/cm2)	0.14	EPA, 2004b	0.3	EPA, 2004b
EF	Exposure frequency (day/yr)	90	professional judgment	250	professional judgment
ED	Exposure duration (yr)	1	professional judgment	1	professional judgment
BW	Body weight (kg)	70	EPA, 1989	70	EPA, 1989
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	365	EPA, 1989	365	EPA, 1989

TABLE 24
EXPOSURE ASSUMPTIONS FOR THE YOUTH TRESPASSER SCENARIO

PARAMETER	DEFINITION	AVERAGE VALUE	REFERENCE	RME VALUE	REFERENCE
PEF	Particulate Emission Factor (m^3/kg)	1.00E+09	EPA, 2004a	1.00E+09	EPA, 2004a
IR	Ingestion rate of soil (mg/day)	100	TNRCC, 1998	100	TNRCC, 1998
SA	Skin surface area (cm2)	3500	TNRCC, 1998	3500	TNRCC, 1998
AF	Soil to skin adherence factor (mg/cm2)	0.1	TNRCC, 1998	0.1	TNRCC, 1998
EF	Exposure frequency (day/yr)	25	professional judgment	50	TNRCC, 1998
ED	Exposure duration (yr)	6	professional judgment	12	TNRCC, 1998
BW	Body weight (kg)	40	EPA, 1991a	40	EPA, 1991a
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	9125	EPA, 1989	9125	EPA, 1989

TABLE 25
EXPOSURE ASSUMPTIONS FOR THE CONTACT RECREATION SCENARIO

PARAMETER	DEFINITION	AVERAGE VALUE	REFERENCE	RME VALUE	REFERENCE
IR	Ingestion rate of soil or sediment (mg/day)	100	TCEQ, 2002	100	TCEQ, 2002
SA	Skin surface area (cm2)	4400	TCEQ, 2002	4400	TCEQ, 2002
AF	Sediment to skin adherence factor (mg/cm2)	0.3	TCEQ, 2002	0.3	TCEQ, 2002
EF	Exposure frequency (day/yr)	19	professional judgment	39	TCEQ, 2002
ED	Exposure duration (yr)	13	professional judgment	25	EPA, 1989
BW	Body weight (kg)	70	EPA, 1989	70	EPA, 1989
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	9125	EPA, 1989	9125	EPA, 1989

TABLE 26
JOHNSON AND ETTINGER VAPOR INTRUSTION MODEL OUTPUT FOR SOUTH AREA GROUNDWATER

Potential Chemical of Concern*	Average	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)	RME EPC (1)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1,1,1-Trichloroethane	1.85E-04	NA	3.55E-06	1.40E-03	NA	2.68E-05
1,1-Dichloroethane	2.10E-03	NA	6.23E-05	1.50E-02	NA	4.45E-04
2-Butanone	4.30E-04	NA	1.38E-07	3.00E-03	NA	9.59E-07
2-Methylnaphthalene	7.76E-04	NA	2.73E-05	8.80E-03	NA	3.09E-04
4,4'-DDE	3.34E-06	5.18E-11	NA	1.00E-05	1.55E-10	NA
Acetophenone	3.72E-03	NA	5.91E-06	4.60E-02	NA	7.31E-05
Benzene	4.25E-04	2.38E-08	2.38E-04	4.20E-03	2.36E-07	2.35E-03
Benzo(b)fluoranthene	3.26E-04	2.95E-08	NA	2.80E-03	1.36E-07	NA
Carbon Disulfide	6.50E-05	NA	8.94E-06	3.00E-04	NA	4.13E-05
Chrysene	1.93E-04	1.83E-10	NA	6.00E-04	5.69E-10	NA
cis-1,2-Dichloroethene	3.27E-03	NA	1.07E-03	3.00E-02	NA	9.86E-03
Fluorene	1.84E-04	NA	1.56E-06	1.00E-03	NA	8.48E-06
gamma-BHC (Lindane)	7.66E-06	3.61E-10	2.16E-06	4.20E-05	1.98E-09	1.18E-05
Isopropylbenzene (Cumene)	1.78E-04	NA	1.34E-05	1.60E-03	NA	1.21E-04
Vinyl Chloride	1.85E-04	6.15E-08	1.63E-04	1.90E-03	6.31E-07	1.67E-03
	TOTAL	**1.15E-07**	**1.60E-03**	**TOTAL**	**1.01E-06**	**1.49E-02**

Notes:
* Only volatile compounds were assesses for this pathway.
(1) RME EPC is the reasonable maximim exposure exposure point concentration.

TABLE 27
JOHNSON AND ETTINGER VAPOR INTRUSTION MODEL OUTPUT FOR
NORTH AREA GROUNDWATER

Potential Chemical of Concern*+	Average	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)	RME EPC [(1)]	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1,1,1-Trichloroethane	**1.48E+01**	**NA**	**2.84E-01**	**1.56E+02**	**NA**	**2.99E+00**
1,1-Dichloroethane	2.80E+00	NA	8.31E-02	3.15E+01	NA	9.34E-01
1,1-Dichloroethene	**3.46E+00**	**NA**	**1.26E+00**	**2.92E+01**	**NA**	**1.06E+01**
1,2,3-Trichloropropane	**6.17E+00**	**3.83E-03**	**3.19E+00**	**4.43E+01**	**2.75E-02**	**2.29E+01**
1,2,4-Trimethylbenzene	3.80E-02	NA	8.29E-02	4.20E-02	NA	9.16E-02
1,2-Dichloroethane	**2.42E+01**	**1.39E-03**	**NA**	**3.28E+02**	**1.89E-02**	**NA**
1,2-Dichloropropane	**4.90E-01**	**3.46E-05**	**1.04E+00**	**3.45E+00**	**2.43E-04**	**7.32E+00**
2-Methylnaphthalene	2.70E-03	NA	9.49E-05	1.60E-02	NA	5.62E-04
4,4'-DDE	2.14E-05	3.32E-10	NA	2.70E-04	4.19E-09	NA
Acenaphthene	9.00E-04	NA	6.96E-06	8.60E-03	NA	6.65E-05
Acetone	2.81E-01	NA	1.33E-03	1.15E-01	NA	5.45E-04
Acetophenone	6.80E-03	NA	1.08E-05	7.40E-02	NA	1.18E-04
alpha-BHC	1.96E-05	3.66E-09	NA	2.00E-04	3.74E-08	NA
Benzene	**1.02E+00**	**5.72E-05**	**5.70E-01**	**8.24E+00**	**4.62E-04**	**4.61E+00**
Benzo(b)fluoranthene	3.23E-04	2.92E-08	NA	1.40E-03	1.27E-07	NA
Carbon Tetrachloride	**5.60E-01**	**2.63E-04**	**NA**	**7.58E+00**	**3.56E-03**	**NA**
cis-1,2-Dichloroethene	**8.96E+00**	**NA**	**2.94E+00**	**1.24E+02**	**NA**	**4.08E+01**
Dibenzofuran	6.01E-04	NA	1.51E-05	4.90E-03	NA	1.23E-04
Dieldrin	5.01E-06	2.52E-09	7.30E-06	2.64E-05	1.33E-08	3.85E-05
Ethylbenzene	9.69E-02	NA	1.89E-03	7.40E-01	NA	1.44E-02
Fluorene	8.51E-04	NA	7.22E-06	6.10E-03	NA	5.18E-05
gamma-BHC (Lindane)	1.25E-04	5.89E-09	3.53E-05	1.50E-03	7.06E-08	4.23E-04
m,p-Xylene	6.85E-02	NA	1.34E-02	1.68E-01	NA	3.28E-02
Methylene Chloride	**9.57E+01**	**1.77E-04**	**2.91E-01**	**1.23E+03**	**2.27E-03**	**3.74E+00**
Naphthalene	7.83E-02	NA	6.40E-02	3.22E-01	NA	2.63E-01
o-Xylene	4.62E-02	NA	7.26E-03	4.40E-02	NA	6.92E-03
Pyrene	2.23E-04	NA	7.70E-07	5.00E-04	NA	1.73E-06
Styrene	2.60E-02	NA	1.98E-04	2.50E-03	NA	1.91E-05
Tetrachloroethene	**1.95E+00**	**2.05E-04**	**1.35E-01**	**2.05E+01**	**2.15E-03**	**1.42E+00**
Toluene	3.35E-01	NA	1.61E-02	4.05E+00	NA	1.94E-01
Trichloroethene	**1.15E+01**	**1.43E-02**	**7.59E+00**	**8.40E+01**	**1.05E-01**	**5.54E+01**
Vinyl Chloride	**5.02E-01**	**1.67E-04**	**4.42E-01**	**5.09E+00**	**1.69E-03**	**4.49E+00**
	TOTAL	**2.04E-02**	**1.80E+01**	**TOTAL**	**1.61E-01**	**1.56E+02**

Notes:
* Only volatile compounds were assesses for this pathway.
+ Compounds with a cancer risk greater than 1×10^{-5} or a hazard index greater than 1 have been bolded.
[(1)] RME EPC is the reasonable maximim exposure exposure point concentration.

TABLE 28
SUMMARY OF HAZARD INDICES AND CANCER RISK ESTIMATES FOR SOIL AND SEDIMENT EXPOSURE

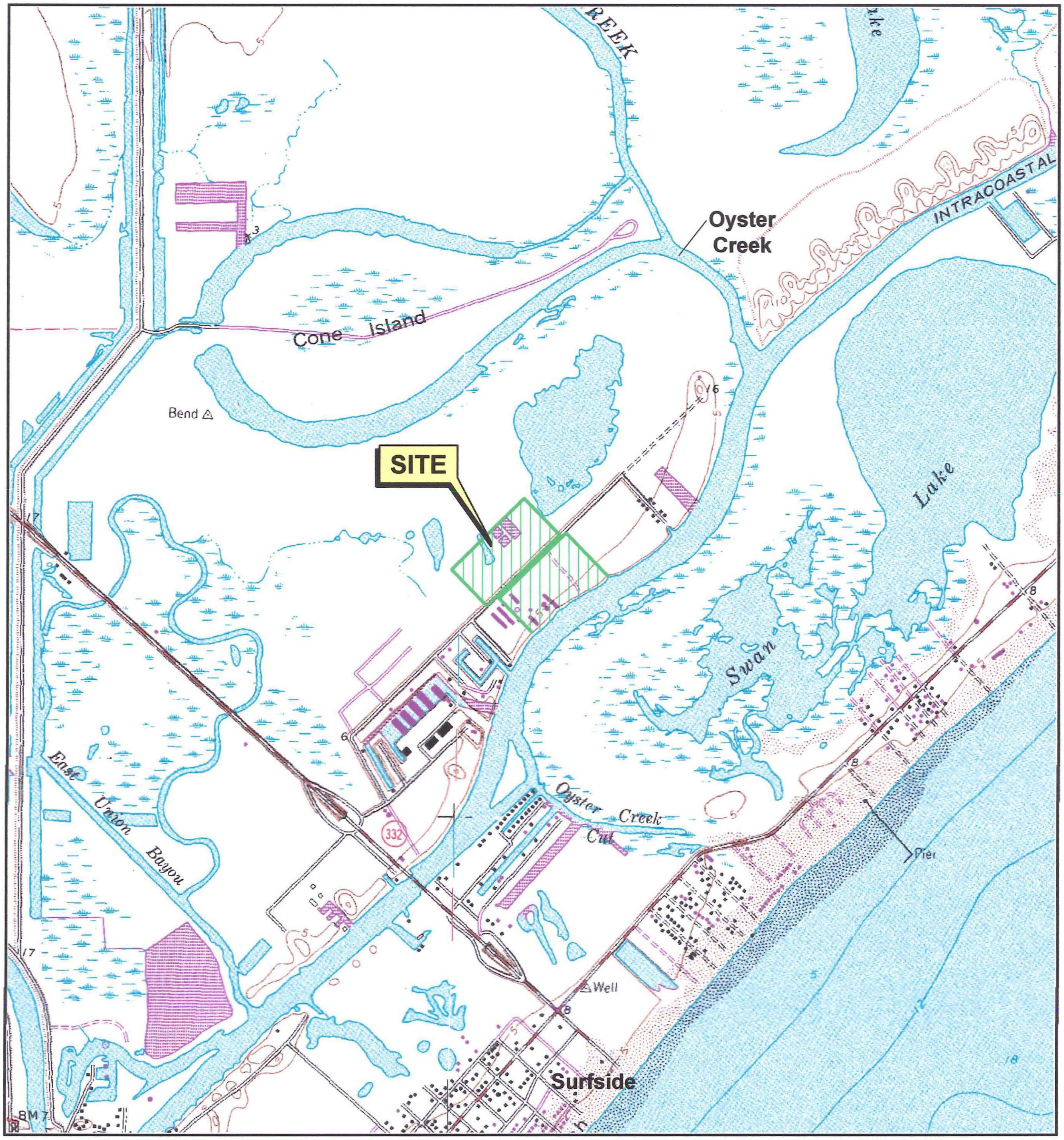
SOUTH AREA

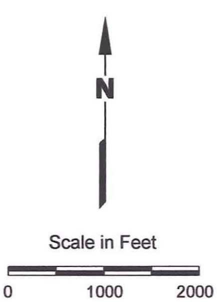
HYPOTHETICAL ON-SITE RECEPTORS	CARCINOGENIC RISK	NONCARCINOGENIC HAZARD INDEX
Average Youth Trespasser (soil)	9.85E-08	1.79E-03
RME Youth Trespasser (soil)	1.09E-06	1.46E-02
Average Construction Worker (soil)	5.22E-08	2.46E-02
RME Construction Worker (soil)	8.19E-07	2.77E-01
Average Industrial Worker (soil)	9.50E-07	2.01E-02
RME Industrial Worker (soil)	6.08E-06	7.04E-02
Average Industrial Worker (vapor intrusion)	1.15E-07	1.60E-03
RME Industrial Worker (vapor intrusion)	1.01E-06	1.49E-02
TOTAL Average Industrial Worker (soil + vapor intrusion)	1.06E-06	2.17E-02
TOTAL RME Industrial Worker (soil + vapor intrusion)	7.09E-06	8.53E-02
Average Contact Recreation (Intracoastal Waterway Sediment)	4.54E-08	8.35E-04
RME Contact Recreation (Intracoastal Waterway Sediment)	3.40E-08	5.43E-03

NORTH AREA

HYPOTHETICAL ON-SITE RECEPTORS	CARCINOGENIC RISK	NONCARCINOGENIC HAZARD INDEX
Average Youth Trespasser (soil)	2.57E-08	6.21E-03
RME Youth Trespasser (soil)	5.71E-07	2.80E-02
Average Construction Worker (soil)	1.37E-08	8.72E-02
RME Construction Worker (soil)	4.27E-07	5.45E-01
Average Industrial Worker (soil)	2.54E-07	7.34E-02
RME Industrial Worker (soil)	3.20E-06	9.28E-02
Average Industrial Worker (vapor intrusion)	2.04E-02	1.80E+01
RME Industrial Worker (vapor intrusion)	1.61E-01	1.56E+02
TOTAL Average Industrial Worker (soil + vapor intrusion)	2.04E-02	1.81E+01
TOTAL RME Industrial Worker (soil + vapor intrusion)	1.61E-01	1.56E+02
Average Contact Recreation (Wetlands Sediment)	1.09E-07	1.07E-03
RME Contact Recreation (Wetlands Sediment)	4.16E-07	4.65E-03
Average Contact Recreation (Pond Sediment)	---*	6.10E-03
RME Contact Recreation (Pond Sediment)	---*	2.85E-02

Notes:
* None of the COPCs for this media are considered carcinogenic by EPA.





GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

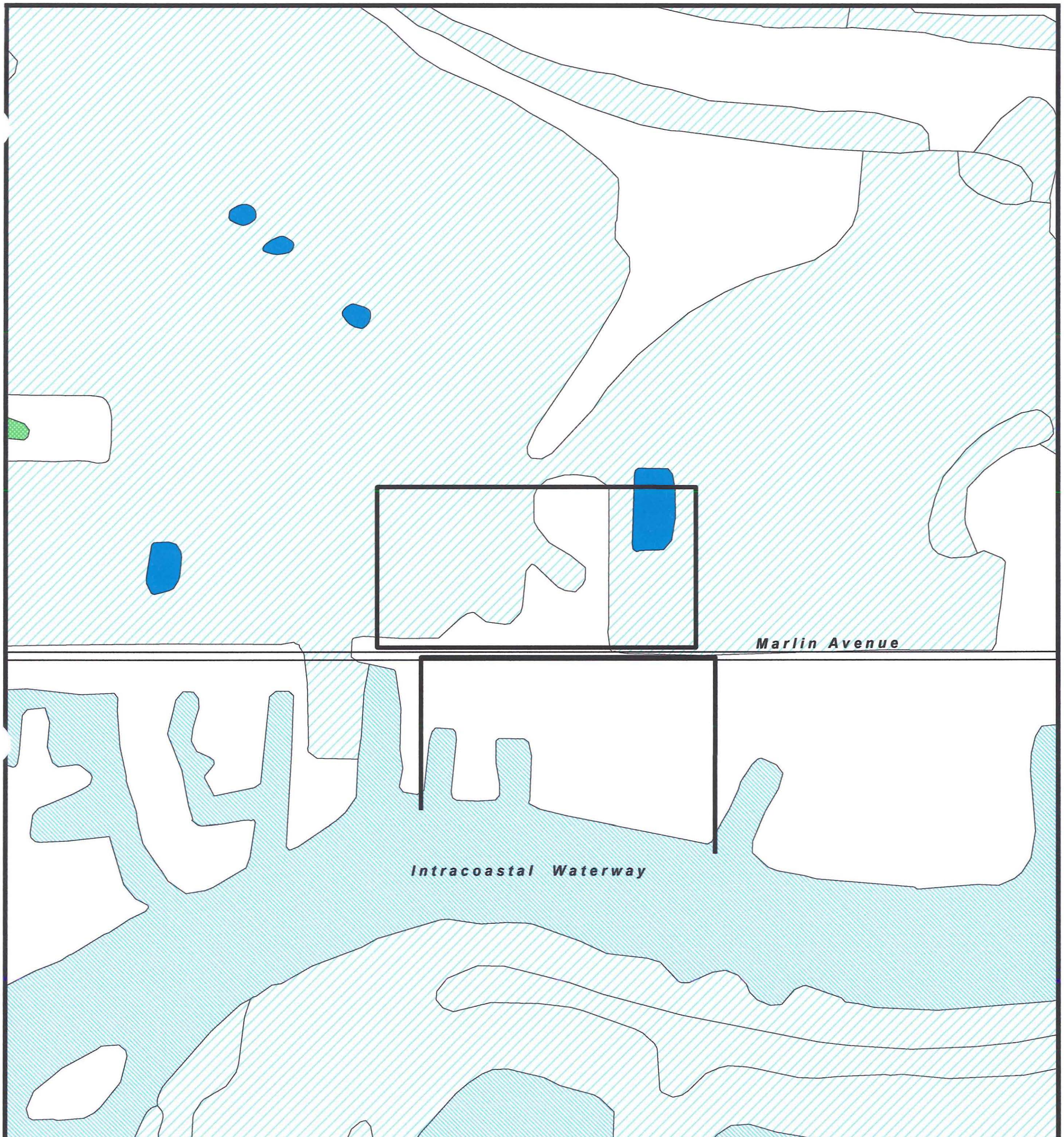
Figure 1

SITE LOCATION MAP

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: FEB., 2010	CHECKED: EFP	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

Source:
Base map taken from http://www.tnris.state.tx.us Freeport, Texas 7.5 min. U.S.G.S. quadrangle, 1974.



EXPLANATION

- Approx. Site Boundary
- Upland Area
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Pond

Approx. Scale in Feet

0 300 600

Source:
U.S. Fish & Wildlife Service, Wetlands Online Mapper, 2008.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 2

WETLAND MAP

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: FEB., 2010	CHECKED: EFP	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

EXPLANATION

IWSE29 ●	Sediment Station
IWSW20 △	Surface Water Station
BSS-1 ◐	Approximate Background Soil Sample Location

Note:
Background fish tissue samples collected from throughout background area.

N

Approx. Scale in Feet
0 125 250

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 3

SOIL AND INTRACOASTAL WATERWAY SEDIMENT AND SURFACE WATER BACKGROUND SAMPLE LOCATIONS

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: FEB., 2010	CHECKED: EFP	

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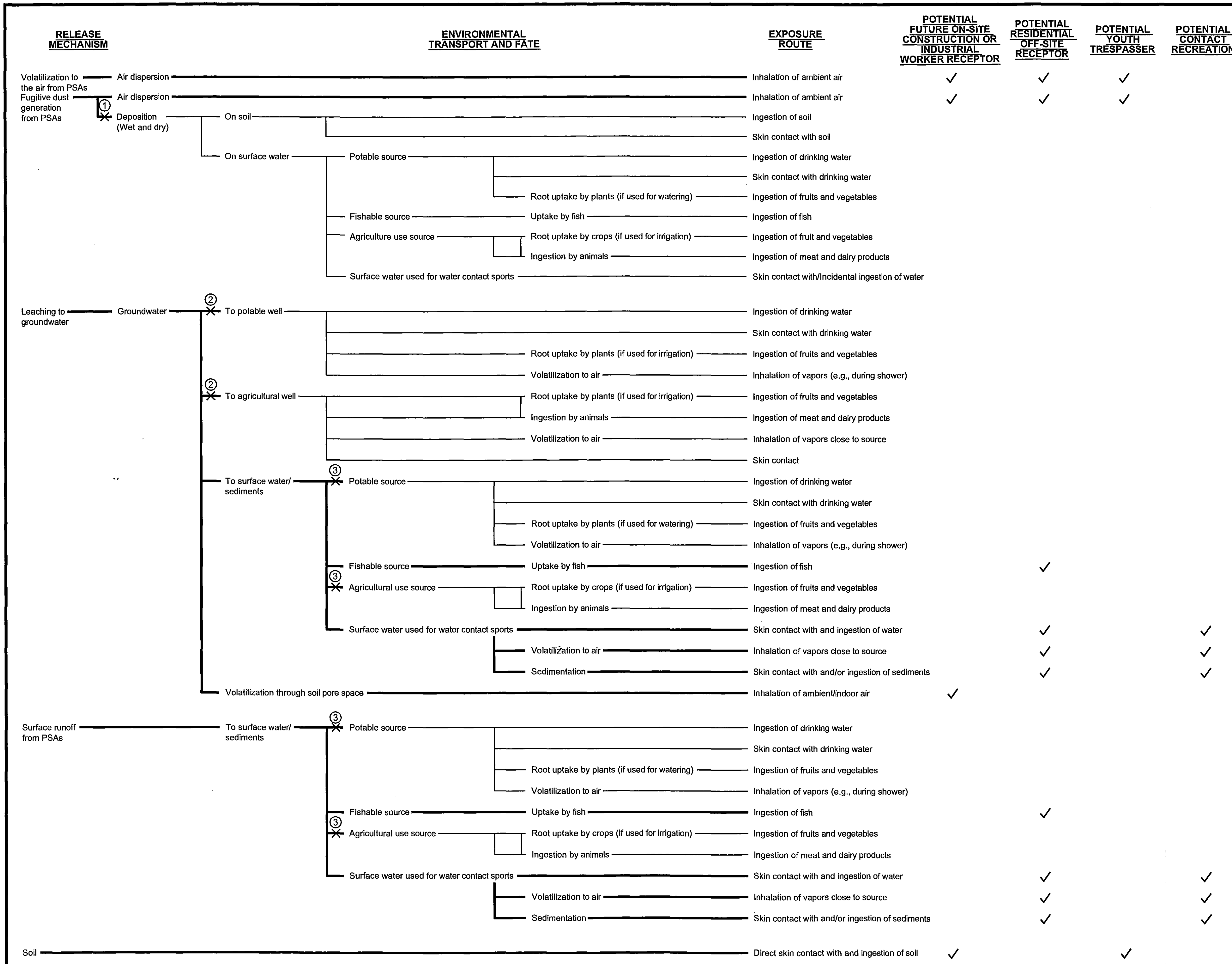

LEGEND:

Pathway is Incomplete

Pathway is Complete, Significance evaluated in Baseline Human Health Risk Assessment (BHHRA)

NOTES:

1. Based on surface soil samples collected on Lots 19 and 20, it does not appear that significant entrainment and subsequent deposition of particulates has occurred at the Site or at off-site locations.

2. No water supply or agricultural wells are in use in the Site vicinity and groundwater in the uppermost water-bearing units is not usable due to high total dissolved solids concentrations. The incompleteness of this pathway is contingent on the continued stability of the groundwater contaminant plume within the uppermost, non-potable water-bearing units at the Site.

3. Surface water is not a potable or agricultural source due to high salinity.

✓ Indicates potential receptor for complete migration pathway.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 4

HUMAN HEALTH CONCEPTUAL SITE MODEL SOUTH AREA

PROJECT: 1352	BY: ZGK	REVISIONS:
DATE: FEB., 2010	CHECKED: KHT	

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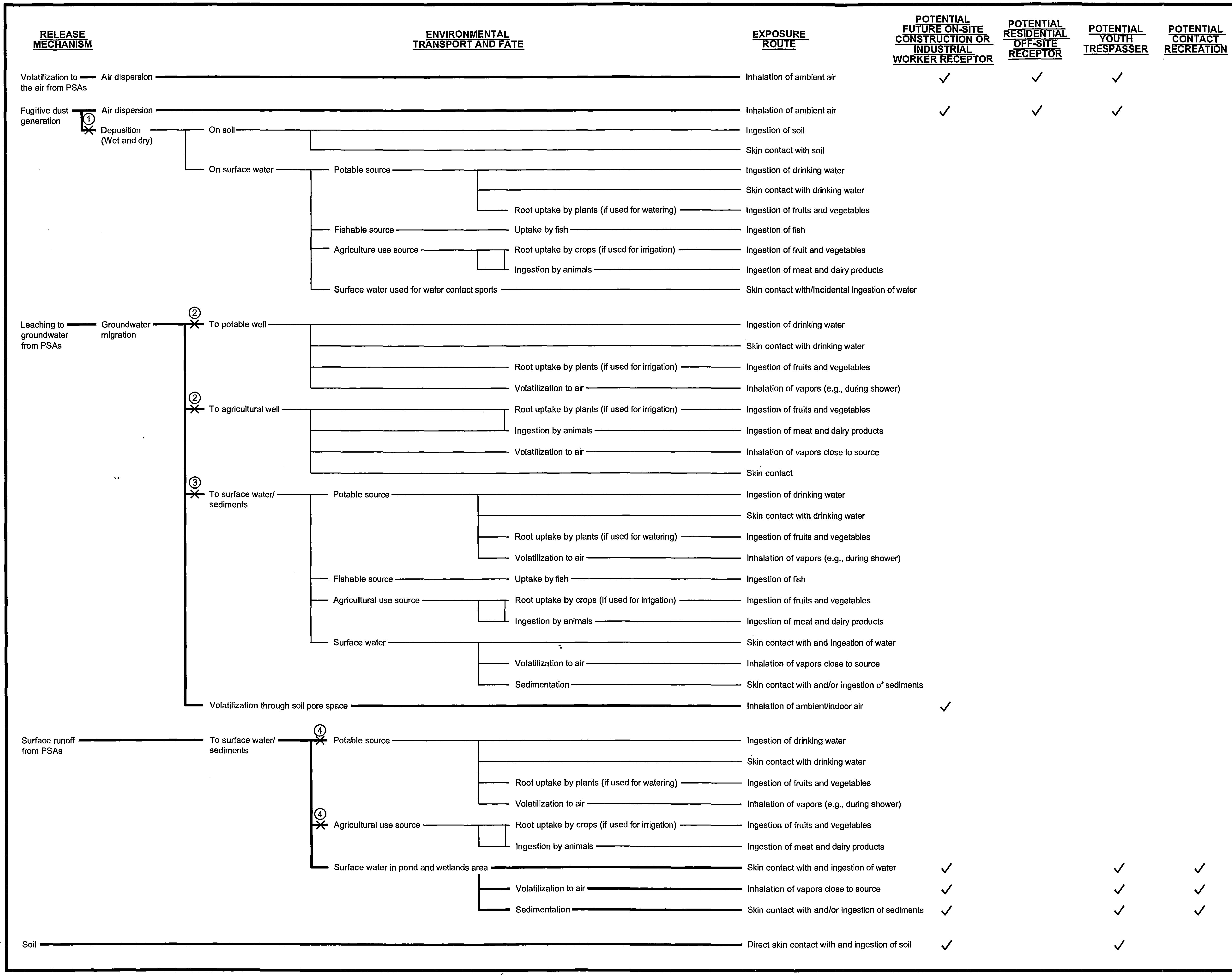

LEGEND:

Pathway is Incomplete

Pathway is Complete, Significance evaluated in Baseline Human Health Risk Assessment (BHHRA)

NOTES:

1. The high moisture content and vegetated nature of the limited surface soils in the North Area are not conducive to significant dust generation, dispersion and subsequent deposition.

2. No water supply or agricultural wells are in use in the Site vicinity and groundwater in the uppermost water-bearing units is not usable due to high total dissolved solids concentrations. The determination of this pathway as incomplete is contingent on the continued stability of the groundwater contaminant plume within the uppermost, non-potable water-bearing units at the Site.

3. Groundwater communication with North Area surface water features (e.g., ponds, wetlands) is not significant due to water table elevations below the shallow depths of these features and the low permeability of underlying clay soils.

4. Nearby surface water is not used for agricultural use or drinking water.

✓ Indicates potential receptor for complete migration pathway.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 5

HUMAN HEALTH CONCEPTUAL SITE MODEL NORTH AREA

PROJECT: 1352	BY: ZGK	REVISIONS:
DATE: FEB., 2010	CHECKED: KHT	

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APPENDIX A

PRO UCL OUTPUT

APPENDIX A-1

SOUTH OF MARLIN SURFACE SOIL

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	C:\Users\Michael\ . . . . \ProUCL data analysis\S of Marlin-SURFACE soil\S of Marlin-SURFACE soil_ProUCL input.
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2-Methylnaphthalene

Total Number of Data	83
Number of Non-Detect Data	61
Number of Detected Data	**22**
Minimum Detected	0.0106
Maximum Detected	0.501
Percent Non-Detects	**73.49%**
Minimum Non-detect	0.00946
Maximum Non-detect	0.106
Mean of Detected Data	0.0806
Median of Detected Data	0.0349
Variance of Detected Data	0.0156
SD of Detected Data	0.125
CV of Detected Data	1.552
Skewness of Detected Data	2.773
Mean of Detected log data	-3.184
SD of Detected Log data	1.075

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	79
Number treated as Detected	4
Single DL Percent Detection	95.18%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0297
SD	0.0701
Standard Error of Mean	0.00789
95% KM (t) UCL	0.0428
95% KM (z) UCL	0.0427
95% KM (BCA) UCL	0.0465
95% KM (Percentile Bootstrap) UCL	0.0436
95% KM (Chebyshev) UCL	0.0641
97.5% KM (Chebyshev) UCL	**0.079**
99% KM (Chebyshev) UCL	0.108

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

4,4'-DDD

Total Number of Data	83
Number of Non-Detect Data	78
Number of Detected Data	**5**

Minimum Detected	0.00264
Maximum Detected	0.0243
Percent Non-Detects	**93.98%**
Minimum Non-detect	2.35E-04
Maximum Non-detect	0.00276
Mean of Detected Data	0.0097
Median of Detected Data	0.00401
Variance of Detected Data	8.64E-05
SD of Detected Data	0.0093
CV of Detected Data	0.959
Skewness of Detected Data	1.266
Mean of Detected log data	-5.005
SD of Detected Log data	0.95

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	79
Number treated as Detected	4
Single DL Percent Detection	95.18%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set.
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.00307
SD	0.00264
Standard Error of Mean	3.24E-04
95% KM (t) UCL	0.0036
95% KM (z) UCL	0.0036
95% KM (BCA) UCL	0.0138
95% KM (Percentile Bootstrap) UCL	0.00485
95% KM (Chebyshev) UCL	0.00448
97.5% KM (Chebyshev) UCL	0.00509
99% KM (Chebyshev) UCL	0.00629

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.00027**
[per recommendation in ProUCL User Guide]

4,4'-DDE

Total Number of Data	83
Number of Non-Detect Data	66
Number of Detected Data	**17**
Minimum Detected	4.28E-04
Maximum Detected	0.0693
Percent Non-Detects	**79.52%**
Minimum Non-detect	3.26E-04

Maximum Non-detect	0.0163
Mean of Detected Data	0.00765
Median of Detected Data	0.0022
Variance of Detected Data	2.81E-04
SD of Detected Data	0.0168
CV of Detected Data	2.193
Skewness of Detected Data	3.524
Mean of Detected log data	-6.02
SD of Detected Log data	1.385

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	81
Number treated as Detected	2
Single DL Percent Detection	97.59%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00192
SD	0.00792
Standard Error of Mean	8.96E-04
95% KM (t) UCL	0.00341
95% KM (z) UCL	0.00339
95% KM (BCA) UCL	0.00382
95% KM (Percentile Bootstrap) UCL	0.00365
95% KM (Chebyshev) UCL	0.00583
97.5% KM (Chebyshev) UCL	**0.00752**
99% KM (Chebyshev) UCL	0.0108

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

4,4'-DDT

Total Number of Data	83
Number of Non-Detect Data	46
Number of Detected Data	**37**
Minimum Detected	2.81E-04
Maximum Detected	0.0625
Percent Non-Detects	**55.42%**
Minimum Non-detect	1.25E-04
Maximum Non-detect	0.00626
Mean of Detected Data	0.00835
Median of Detected Data	0.00304
Variance of Detected Data	1.58E-04
SD of Detected Data	0.0126
CV of Detected Data	1.506
Skewness of Detected Data	2.7
Mean of Detected log data	-5.808
SD of Detected Log data	1.551

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	70
Number treated as Detected	13
Single DL Percent Detection	84.34%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00389
SD	0.0092
Standard Error of Mean	0.00102
95% KM (t) UCL	0.00559
95% KM (z) UCL	0.00558
95% KM (BCA) UCL	0.00567
95% KM (Percentile Bootstrap) UCL	0.0057
95% KM (Chebyshev) UCL	0.00836
97.5% KM (Chebyshev) UCL	**0.0103**
99% KM (Chebyshev) UCL	0.0141

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Acenaphthene

Total Number of Data	83
Number of Non-Detect Data	57
Number of Detected Data	**26**
Minimum Detected	0.0113
Maximum Detected	1.69
Percent Non-Detects	**68.67%**
Minimum Non-detect	0.0087
Maximum Non-detect	0.0975
Mean of Detected Data	0.168
Median of Detected Data	0.072
Variance of Detected Data	0.114
SD of Detected Data	0.337
CV of Detected Data	2.009
Skewness of Detected Data	4.078
Mean of Detected log data	-2.641
SD of Detected Log data	1.211

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	73
Number treated as Detected	10
Single DL Percent Detection	87.95%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0608
SD	0.199

Standard Error of Mean	0.0222
95% KM (t) UCL	0.0978
95% KM (z) UCL	0.0974
95% KM (BCA) UCL	0.11
95% KM (Percentile Bootstrap) UCL	0.102
95% KM (Chebyshev) UCL	0.158
97.5% KM (Chebyshev) UCL	**0.2**
99% KM (Chebyshev) UCL	0.282

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Acenaphthylene

Total Number of Data	83
Number of Non-Detect Data	64
Number of Detected Data	**19**
Minimum Detected	0.0184
Maximum Detected	0.935
Percent Non-Detects	**77.11%**
Minimum Non-detect	0.00986
Maximum Non-detect	0.11
Mean of Detected Data	0.135
Median of Detected Data	0.072
Variance of Detected Data	0.0414
SD of Detected Data	0.204
CV of Detected Data	1.503
Skewness of Detected Data	3.708
Mean of Detected log data	-2.521
SD of Detected Log data	0.954

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	76
Number treated as Detected	7
Single DL Percent Detection	91.57%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0455
SD	0.107
Standard Error of Mean	0.012
95% KM (t) UCL	0.0655
95% KM (z) UCL	0.0653
95% KM (BCA) UCL	0.082
95% KM (Percentile Bootstrap) UCL	0.0704
95% KM (Chebyshev) UCL	0.098
97.5% KM (Chebyshev) UCL	**0.121**
99% KM (Chebyshev) UCL	0.165

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Aluminum

Number of Valid Observations	83
Number of Distinct Observations	79
Minimum	414
Maximum	15200
Mean	5335
Median	4650
SD	3345
Variance	11191315
Coefficient of Variation	0.627
Skewness	0.744
Mean of log data	8.345
SD of log data	0.757

95% Useful UCLs	
Student's-t UCL	**5946**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	5971
95% Modified-t UCL	5951

Non-Parametric UCLs	
95% CLT UCL	5939
95% Jackknife UCL	5946
95% Standard Bootstrap UCL	5943
95% Bootstrap-t UCL	6001
95% Hall's Bootstrap UCL	5973
95% Percentile Bootstrap UCL	5960
95% BCA Bootstrap UCL	6000
95% Chebyshev(Mean, Sd) UCL	6936
97.5% Chebyshev(Mean, Sd) UCL	7628
99% Chebyshev(Mean, Sd) UCL	8989

Data appear Normal (0.05)
May want to try Normal UCLs

Anthracene

Total Number of Data	83
Number of Non-Detect Data	46
Number of Detected Data	**37**
Minimum Detected	0.0112
Maximum Detected	2.46
Percent Non-Detects	**55.42%**
Minimum Non-detect	0.00982
Maximum Non-detect	0.107

Mean of Detected Data	0.203
Median of Detected Data	0.0886
Variance of Detected Data	0.175
SD of Detected Data	0.418
CV of Detected Data	2.06
Skewness of Detected Data	4.761
Mean of Detected log data	-2.479
SD of Detected Log data	1.282

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	65
Number treated as Detected	18
Single DL Percent Detection	78.31%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0971
SD	0.291
Standard Error of Mean	0.0324
95% KM (t) UCL	0.151
95% KM (z) UCL	0.15
95% KM (BCA) UCL	0.158
95% KM (Percentile Bootstrap) UCL	0.156
95% KM (Chebyshev) UCL	0.238
97.5% KM (Chebyshev) UCL	**0.299**
99% KM (Chebyshev) UCL	0.419

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Antimony

Total Number of Data	83
Number of Non-Detect Data	48
Number of Detected Data	**35**
Minimum Detected	1.13
Maximum Detected	5.14
Percent Non-Detects	**57.83%**
Minimum Non-detect	0.19
Maximum Non-detect	0.43

Mean of Detected Data	2.372
Median of Detected Data	2.17
Variance of Detected Data	0.831
SD of Detected Data	0.912
CV of Detected Data	0.384
Skewness of Detected Data	1.014
Mean of Detected log data	0.796
SD of Detected Log data	0.372

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	1.654
SD	0.847
Standard Error of Mean	0.0943
95% KM (t) UCL	1.811
95% KM (z) UCL	1.809
95% KM (BCA) UCL	1.872

95% KM (Percentile Bootstrap) UCL	1.845
95% KM (Chebyshev) UCL	2.065
97.5% KM (Chebyshev) UCL	**2.242**
99% KM (Chebyshev) UCL	2.592

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Aroclor-1254

Total Number of Data	85
Number of Non-Detect Data	73
Number of Detected Data	**12**
Minimum Detected	0.0109
Maximum Detected	7.98
Percent Non-Detects	**85.88%**
Minimum Non-detect	0.00325
Maximum Non-detect	0.0381
Mean of Detected Data	0.967
Median of Detected Data	0.144
Variance of Detected Data	5.039
SD of Detected Data	2.245
CV of Detected Data	2.321
Skewness of Detected Data	3.277
Mean of Detected log data	-1.66
SD of Detected Log data	1.897

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	76
Number treated as Detected	9
Single DL Percent Detection	89.41%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.146
SD	0.873
Standard Error of Mean	0.099
95% KM (t) UCL	0.31
95% KM (z) UCL	0.309
95% KM (BCA) UCL	0.401
95% KM (Percentile Bootstrap) UCL	0.342
95% KM (Chebyshev) UCL	0.577
97.5% KM (Chebyshev) UCL	**0.764**
99% KM (Chebyshev) UCL	1.13

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Arsenic

Total Number of Data	83
Number of Non-Detect Data	12

Number of Detected Data	**71**
Minimum Detected	0.26
Maximum Detected	24.3
Percent Non-Detects	**14.46%**
Minimum Non-detect	0.17
Maximum Non-detect	1.44
Mean of Detected Data	4.313
Median of Detected Data	2.93
Variance of Detected Data	16.5
SD of Detected Data	4.062
CV of Detected Data	0.942
Skewness of Detected Data	2.522
Mean of Detected log data	1.106
SD of Detected Log data	0.882

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	23
Number treated as Detected	60
Single DL Percent Detection	27.71%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	27.71%
Mean	2.801
SD	1.229
95% Winsor (t) UCL	3.029
Kaplan Meier (KM) Method	
Mean	3.739
SD	3.984
Standard Error of Mean	0.44
95% KM (t) UCL	4.472
95% KM (z) UCL	4.463
95% KM (BCA) UCL	4.578
95% KM (Percentile Bootstrap) UCL	4.49
95% KM (Chebyshev) UCL	5.659
97.5% KM (Chebyshev) UCL	**6.49**
99% KM (Chebyshev) UCL	8.122

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Barium

Number of Valid Observations	83
Number of Distinct Observations	79
Minimum	18.6
Maximum	2180
Mean	345.2
Median	206
SD	349
Variance	121792
Coefficient of Variation	1.011
Skewness	2.74
Mean of log data	5.482
SD of log data	0.84

95% Useful UCLs	
Student's-t UCL	408.9
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	420.5
95% Modified-t UCL	410.9
Non-Parametric UCLs	
95% CLT UCL	408.2
95% Jackknife UCL	408.9
95% Standard Bootstrap UCL	407.6
95% Bootstrap-t UCL	422
95% Hall's Bootstrap UCL	433.9
95% Percentile Bootstrap UCL	411
95% BCA Bootstrap UCL	425.9
95% Chebyshev(Mean, Sd) UCL	512.2
97.5% Chebyshev(Mean, Sd) UCL	**584.4**
99% Chebyshev(Mean, Sd) UCL	726.4

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Benzo(a)anthracene

Total Number of Data	83
Number of Non-Detect Data	53
Number of Detected Data	**30**
Minimum Detected	0.0286
Maximum Detected	5.02
Percent Non-Detects	**63.86%**
Minimum Non-detect	0.0089
Maximum Non-detect	0.0998
Mean of Detected Data	0.936
Median of Detected Data	0.573
Variance of Detected Data	1.21
SD of Detected Data	1.1
CV of Detected Data	1.175
Skewness of Detected Data	2.02
Mean of Detected log data	-0.895
SD of Detected Log data	1.505

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	60
Number treated as Detected	23
Single DL Percent Detection	72.29%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.357
SD	0.783
Standard Error of Mean	0.0874
95% KM (t) UCL	0.502

95% KM (z) UCL	0.501
95% KM (BCA) UCL	0.521
95% KM (Percentile Bootstrap) UCL	0.509
95% KM (Chebyshev) UCL	0.738
97.5% KM (Chebyshev) UCL	**0.903**
99% KM (Chebyshev) UCL	1.226

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Benzo(a)pyrene

Total Number of Data	83
Number of Non-Detect Data	18
Number of Detected Data	**65**
Minimum Detected	0.0103
Maximum Detected	4.57
Percent Non-Detects	**21.69%**
Minimum Non-detect	0.00886
Maximum Non-detect	0.0984
Mean of Detected Data	0.575
Median of Detected Data	0.0887
Variance of Detected Data	1.014
SD of Detected Data	1.007
CV of Detected Data	1.751
Skewness of Detected Data	2.332
Mean of Detected log data	-2.005
SD of Detected Log data	1.79

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	52
Number treated as Detected	31
Single DL Percent Detection	62.65%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.453
SD	0.914
Standard Error of Mean	0.101
95% KM (t) UCL	0.621
95% KM (z) UCL	0.619
95% KM (BCA) UCL	0.624
95% KM (Percentile Bootstrap) UCL	0.628
95% KM (Chebyshev) UCL	0.894
97.5% KM (Chebyshev) UCL	**1.085**
99% KM (Chebyshev) UCL	1.459

Potential UCL to Use ________

Benzo(b)fluoranthene

Total Number of Data	83

Number of Non-Detect Data	22
Number of Detected Data	**61**
Minimum Detected	0.0408
Maximum Detected	5.42
Percent Non-Detects	**26.51%**
Minimum Non-detect	0.00677
Maximum Non-detect	0.147
Mean of Detected Data	0.784
Median of Detected Data	0.21
Variance of Detected Data	1.421
SD of Detected Data	1.192
CV of Detected Data	1.52
Skewness of Detected Data	2.244
Mean of Detected log data	-1.212
SD of Detected Log data	1.393

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	47
Number treated as Detected	36
Single DL Percent Detection	56.63%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.588
SD	1.065
Standard Error of Mean	0.118
95% KM (t) UCL	0.784
95% KM (z) UCL	0.782
95% KM (BCA) UCL	0.823
95% KM (Percentile Bootstrap) UCL	0.793
95% KM (Chebyshev) UCL	1.102
97.5% KM (Chebyshev) UCL	1.324
99% KM (Chebyshev) UCL	1.76

Potential UCL to Use
95% KM (Chebyshev) UCL **1.102**

Benzo(g,h,i)perylene

Total Number of Data	83
Number of Non-Detect Data	34
Number of Detected Data	**49**
Minimum Detected	0.00989
Maximum Detected	4.24
Percent Non-Detects	**40.96%**
Minimum Non-detect	0.00887
Maximum Non-detect	1.03
Mean of Detected Data	0.502
Median of Detected Data	0.114
Variance of Detected Data	0.744
SD of Detected Data	0.863
CV of Detected Data	1.719

Skewness of Detected Data	2.664
Mean of Detected log data	-1.881
SD of Detected Log data	1.582

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	76
Number treated as Detected	7
Single DL Percent Detection	91.57%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.304
SD	0.699
Standard Error of Mean	0.0776
95% KM (t) UCL	0.433
95% KM (z) UCL	0.432
95% KM (BCA) UCL	0.441
95% KM (Percentile Bootstrap) UCL	0.436
95% KM (Chebyshev) UCL	0.643
97.5% KM (Chebyshev) UCL	**0.789**
99% KM (Chebyshev) UCL	1.076

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Benzo(k)fluoranthene

Total Number of Data	83
Number of Non-Detect Data	50
Number of Detected Data	**33**
Minimum Detected	0.0195
Maximum Detected	4.25
Percent Non-Detects	**60.24%**
Minimum Non-detect	0.0137
Maximum Non-detect	0.153

Mean of Detected Data	0.583
Median of Detected Data	0.228
Variance of Detected Data	0.722
SD of Detected Data	0.85
CV of Detected Data	1.458
Skewness of Detected Data	2.793
Mean of Detected log data	-1.499
SD of Detected Log data	1.5

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	64
Number treated as Detected	19
Single DL Percent Detection	77.11%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.244
SD	0.595
Standard Error of Mean	0.0663
95% KM (t) UCL	0.354
95% KM (z) UCL	0.353
95% KM (BCA) UCL	0.359
95% KM (Percentile Bootstrap) UCL	0.356
95% KM (Chebyshev) UCL	0.533
97.5% KM (Chebyshev) UCL	**0.658**
99% KM (Chebyshev) UCL	0.904

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Beryllium

Total Number of Data	83
Number of Non-Detect Data	1
Number of Detected Data	**82**
Minimum Detected	0.014
Maximum Detected	4.6
Percent Non-Detects	**1.20%**
Minimum Non-detect	0.0031
Maximum Non-detect	0.0031

Mean of Detected Data	0.413
Median of Detected Data	0.325
Variance of Detected Data	0.277
SD of Detected Data	0.527
CV of Detected Data	1.275
Skewness of Detected Data	6.355
Mean of Detected log data	-1.306
SD of Detected Log data	0.991

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	0.991
Mean	0.366
SD	0.257
95% Winsor (t) UCL	0.413

Kaplan Meier (KM) Method	
Mean	0.408
SD	0.522
Standard Error of Mean	0.0577
95% KM (t) UCL	0.504
95% KM (z) UCL	0.503
95% KM (BCA) UCL	0.524
95% KM (Percentile Bootstrap) UCL	0.514
95% KM (Chebyshev) UCL	0.66
97.5% KM (Chebyshev) UCL	**0.768**
99% KM (Chebyshev) UCL	0.982

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Boron

Total Number of Data	83
Number of Non-Detect Data	49
Number of Detected Data	**34**
Minimum Detected	2.43
Maximum Detected	54.4
Percent Non-Detects	**59.04%**
Minimum Non-detect	0.95
Maximum Non-detect	15.3

Mean of Detected Data	9.961
Median of Detected Data	8.78
Variance of Detected Data	81.05
SD of Detected Data	9.003
CV of Detected Data	0.904
Skewness of Detected Data	3.951
Mean of Detected log data	2.084
SD of Detected Log data	0.622

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	81
Number treated as Detected	2
Single DL Percent Detection	97.59%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	5.559
SD	6.776
Standard Error of Mean	0.756
95% KM (t) UCL	6.817
95% KM (z) UCL	6.803
95% KM (BCA) UCL	7.256
95% KM (Percentile Bootstrap) UCL	7.074
95% KM (Chebyshev) UCL	8.856
97.5% KM (Chebyshev) UCL	10.28
99% KM (Chebyshev) UCL	13.08

Potential UCL to Use	
95% KM (t) UCL	6.817
95% KM (% Bootstrap) UCL	**7.074**

Butyl benzyl phthalate

Total Number of Data	83
Number of Non-Detect Data	77
Number of Detected Data	**6**
Minimum Detected	0.0129
Maximum Detected	0.297
Percent Non-Detects	**92.77%**
Minimum Non-detect	0.0109
Maximum Non-detect	0.123

Mean of Detected Data	0.0956
Median of Detected Data	0.0359
Variance of Detected Data	0.013
SD of Detected Data	0.114
CV of Detected Data	1.193
Skewness of Detected Data	1.455
Mean of Detected log data	-2.959
SD of Detected Log data	1.207

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	81
Number treated as Detected	2
Single DL Percent Detection	97.59%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.019
SD	0.0352
Standard Error of Mean	0.00424
95% KM (t) UCL	0.0261
95% KM (z) UCL	0.026
95% KM (BCA) UCL	0.0493
95% KM (Percentile Bootstrap) UCL	0.0415
95% KM (Chebyshev) UCL	0.0375
97.5% KM (Chebyshev) UCL	0.0455
99% KM (Chebyshev) UCL	0.0612

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median = <0.01250**
[per recommendation in ProUCL User Guide]

Cadmium

Total Number of Data	83
Number of Non-Detect Data	33
Number of Detected Data	**50**
Minimum Detected	0.023
Maximum Detected	9.71
Percent Non-Detects	**39.76%**
Minimum Non-detect	0.017
Maximum Non-detect	0.052

Mean of Detected Data	0.764
Median of Detected Data	0.47

Variance of Detected Data	1.948
SD of Detected Data	1.396
CV of Detected Data	1.828
Skewness of Detected Data	5.725
Mean of Detected log data	-0.79
SD of Detected Log data	0.942

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	34
Number treated as Detected	49
Single DL Percent Detection	40.96%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	40.96%
Mean	0.189
SD	0.112
95% Winsor (t) UCL	0.211

Kaplan Meier (KM) Method	
Mean	0.469
SD	1.132
Standard Error of Mean	0.126
95% KM (t) UCL	0.678
95% KM (z) UCL	0.676
95% KM (BCA) UCL	0.751
95% KM (Percentile Bootstrap) UCL	0.707
95% KM (Chebyshev) UCL	1.016
97.5% KM (Chebyshev) UCL	**1.253**
99% KM (Chebyshev) UCL	1.718

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Carbazole

Total Number of Data	83
Number of Non-Detect Data	54
Number of Detected Data	**29**
Minimum Detected	0.0104
Maximum Detected	1.54
Percent Non-Detects	**65.06%**
Minimum Non-detect	0.00864
Maximum Non-detect	0.0967

Mean of Detected Data	0.157
Median of Detected Data	0.0855
Variance of Detected Data	0.0927
SD of Detected Data	0.304
CV of Detected Data	1.94
Skewness of Detected Data	3.888
Mean of Detected log data	-2.751
SD of Detected Log data	1.285

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	70
Number treated as Detected	13
Single DL Percent Detection	84.34%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.062
SD	0.19
Standard Error of Mean	0.0212
95% KM (t) UCL	0.0973
95% KM (z) UCL	0.0969
95% KM (BCA) UCL	0.107
95% KM (Percentile Bootstrap) UCL	0.104
95% KM (Chebyshev) UCL	0.155
97.5% KM (Chebyshev) UCL	**0.195**
99% KM (Chebyshev) UCL	0.273

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Chromium

Number of Valid Observations	83
Number of Distinct Observations	75
Minimum	3.37
Maximum	136
Mean	16.08
Median	12.6
SD	15.7
Variance	246.5
Coefficient of Variation	0.977
Skewness	5.833
Mean of log data	2.58
SD of log data	0.568

95% Useful UCLs	
Student's-t UCL	18.94

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	20.09
95% Modified-t UCL	19.13

Non-Parametric UCLs	
95% CLT UCL	18.91
95% Jackknife UCL	18.94
95% Standard Bootstrap UCL	18.9
95% Bootstrap-t UCL	21.61
95% Hall's Bootstrap UCL	32
95% Percentile Bootstrap UCL	19.25
95% BCA Bootstrap UCL	20.82
95% Chebyshev(Mean, Sd) UCL	23.59
97.5% Chebyshev(Mean, Sd) UCL	**26.84**
99% Chebyshev(Mean, Sd) UCL	33.22

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Chrysene

Total Number of Data	83
Number of Non-Detect Data	27
Number of Detected Data	**56**
Minimum Detected	0.00932
Maximum Detected	4.87
Percent Non-Detects	**32.53%**
Minimum Non-detect	0.00842
Maximum Non-detect	0.0906
Mean of Detected Data	0.6
Median of Detected Data	0.16
Variance of Detected Data	0.927
SD of Detected Data	0.963
CV of Detected Data	1.604
Skewness of Detected Data	2.449
Mean of Detected log data	-1.726
SD of Detected Log data	1.665

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	50
Number treated as Detected	33
Single DL Percent Detection	60.24%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.409
SD	0.831
Standard Error of Mean	0.092
95% KM (t) UCL	0.562
95% KM (z) UCL	0.56
95% KM (BCA) UCL	0.562
95% KM (Percentile Bootstrap) UCL	0.567
95% KM (Chebyshev) UCL	0.81
97.5% KM (Chebyshev) UCL	**0.984**
99% KM (Chebyshev) UCL	1.324

Potential UCL to Use ______

Cobalt

Total Number of Data	83
Number of Non-Detect Data	1
Number of Detected Data	**82**
Minimum Detected	0.049
Maximum Detected	16
Percent Non-Detects	**1.20%**
Minimum Non-detect	0.025
Maximum Non-detect	0.025
Mean of Detected Data	3.75

Median of Detected Data	3.495
Variance of Detected Data	4.948
SD of Detected Data	2.224
CV of Detected Data	0.593
Skewness of Detected Data	2.276
Mean of Detected log data	1.135
SD of Detected Log data	0.731

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	0.731
Mean	3.617
SD	1.87
95% Winsor (t) UCL	3.959

Kaplan Meier (KM) Method	
Mean	3.706
SD	2.234
Standard Error of Mean	0.247
95% KM (t) UCL	4.116
95% KM (z) UCL	4.112
95% KM (BCA) UCL	4.111
95% KM (Percentile Bootstrap) UCL	4.129
95% KM (Chebyshev) UCL	4.781
97.5% KM (Chebyshev) UCL	**5.247**
99% KM (Chebyshev) UCL	6.161

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Copper

Number of Valid Observations	83
Number of Distinct Observations	78
Minimum	1.55
Maximum	216
Mean	27.98
Median	16.4
SD	35.35
Variance	1249
Coefficient of Variation	1.263
Skewness	3.794
Mean of log data	2.929
SD of log data	0.844

95% Useful UCLs	
Student's-t UCL	34.43

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	36.09
95% Modified-t UCL	34.7

Non-Parametric UCLs	
95% CLT UCL	34.36
95% Jackknife UCL	34.43
95% Standard Bootstrap UCL	34.31
95% Bootstrap-t UCL	38.14
95% Hall's Bootstrap UCL	39.6
95% Percentile Bootstrap UCL	35.32

95% BCA Bootstrap UCL	36.93
95% Chebyshev(Mean, Sd) UCL	44.89
97.5% Chebyshev(Mean, Sd) UCL	**52.21**
99% Chebyshev(Mean, Sd) UCL	66.58

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Dibenz(a,h)anthracene

Total Number of Data	83
Number of Non-Detect Data	47
Number of Detected Data	**36**
Minimum Detected	0.0639
Maximum Detected	1.64
Percent Non-Detects	**56.63%**
Minimum Non-detect	0.00846
Maximum Non-detect	0.0946
Mean of Detected Data	0.347
Median of Detected Data	0.143
Variance of Detected Data	0.148
SD of Detected Data	0.385
CV of Detected Data	1.109
Skewness of Detected Data	1.917
Mean of Detected log data	-1.528
SD of Detected Log data	0.938

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	54
Number treated as Detected	29
Single DL Percent Detection	65.06%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.187
SD	0.286
Standard Error of Mean	0.0319
95% KM (t) UCL	0.24
95% KM (z) UCL	0.239
95% KM (BCA) UCL	0.249
95% KM (Percentile Bootstrap) UCL	0.245
95% KM (Chebyshev) UCL	0.326
97.5% KM (Chebyshev) UCL	0.386
99% KM (Chebyshev) UCL	0.504

Potential UCL to Use

95% KM (t) UCL	0.24
95% KM (% Bootstrap) UCL	**0.245**

Dibenzofuran

Total Number of Data	83

Number of Non-Detect Data	66
Number of Detected Data	**17**
Minimum Detected	0.0167
Maximum Detected	0.821
Percent Non-Detects	**79.52%**
Minimum Non-detect	0.0124
Maximum Non-detect	0.139
Mean of Detected Data	0.132
Median of Detected Data	0.0603
Variance of Detected Data	0.0456
SD of Detected Data	0.214
CV of Detected Data	1.623
Skewness of Detected Data	2.78
Mean of Detected log data	-2.684
SD of Detected Log data	1.02

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	81
Number treated as Detected	2
Single DL Percent Detection	97.59%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.041
SD	0.105
Standard Error of Mean	0.0119
95% KM (t) UCL	0.0607
95% KM (z) UCL	0.0605
95% KM (BCA) UCL	0.0723
95% KM (Percentile Bootstrap) UCL	0.0659
95% KM (Chebyshev) UCL	0.0927
97.5% KM (Chebyshev) UCL	0.115
99% KM (Chebyshev) UCL	0.159

Potential UCL to Use

95% KM (BCA) UCL	**0.0723**

Dieldrin

Total Number of Data	83
Number of Non-Detect Data	62
Number of Detected Data	**21**
Minimum Detected	2.43E-04
Maximum Detected	0.0205
Percent Non-Detects	**74.70%**
Minimum Non-detect	1.40E-04
Maximum Non-detect	0.00701
Mean of Detected Data	0.00336
Median of Detected Data	0.00138
Variance of Detected Data	2.95E-05
SD of Detected Data	0.00543
CV of Detected Data	1.617

Skewness of Detected Data	2.499
Mean of Detected log data	-6.547
SD of Detected Log data	1.257

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	80
Number treated as Detected	3
Single DL Percent Detection	96.39%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00104
SD	0.00299
Standard Error of Mean	3.36E-04
95% KM (t) UCL	0.0016
95% KM (z) UCL	0.00159
95% KM (BCA) UCL	0.00187
95% KM (Percentile Bootstrap) UCL	0.00163
95% KM (Chebyshev) UCL	0.00251
97.5% KM (Chebyshev) UCL	**0.00314**
99% KM (Chebyshev) UCL	0.00439

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Di-n-butyl phthalate

Total Number of Data	83
Number of Non-Detect Data	74
Number of Detected Data	**9**
Minimum Detected	0.0368
Maximum Detected	0.753
Percent Non-Detects	**89.16%**
Minimum Non-detect	0.0251
Maximum Non-detect	0.28

Mean of Detected Data	0.217
Median of Detected Data	0.0819
Variance of Detected Data	0.0586
SD of Detected Data	0.242
CV of Detected Data	1.117
Skewness of Detected Data	1.577
Mean of Detected log data	-2.084
SD of Detected Log data	1.12

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	80
Number treated as Detected	3
Single DL Percent Detection	96.39%

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0566
SD	0.0938
Standard Error of Mean	0.0109
95% KM (t) UCL	0.0748
95% KM (z) UCL	0.0746
95% KM (BCA) UCL	0.0993
95% KM (Percentile Bootstrap) UCL	0.0819
95% KM (Chebyshev) UCL	0.104
97.5% KM (Chebyshev) UCL	**0.125**
99% KM (Chebyshev) UCL	0.166

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Endosulfan sulfate

Total Number of Data	83
Number of Non-Detect Data	66
Number of Detected Data	**17**
Minimum Detected	4.56E-04
Maximum Detected	0.0713
Percent Non-Detects	**79.52%**
Minimum Non-detect	2.65E-04
Maximum Non-detect	0.0133

Mean of Detected Data	0.00837
Median of Detected Data	0.00154
Variance of Detected Data	3.09E-04
SD of Detected Data	0.0176
CV of Detected Data	2.098
Skewness of Detected Data	3.28
Mean of Detected log data	-6.019
SD of Detected Log data	1.472

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	80
Number treated as Detected	3
Single DL Percent Detection	96.39%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00209
SD	0.00835

Standard Error of Mean	9.45E-04
95% KM (t) UCL	0.00366
95% KM (z) UCL	0.00364
95% KM (BCA) UCL	0.00421
95% KM (Percentile Bootstrap) UCL	0.00385
95% KM (Chebyshev) UCL	0.0062
97.5% KM (Chebyshev) UCL	0.00799
99% KM (Chebyshev) UCL	0.0115

Potential UCL to Use

95% KM (BCA) UCL	**0.00421**

Endrin aldehyde

Total Number of Data	83
Number of Non-Detect Data	61
Number of Detected Data	**22**
Minimum Detected	4.97E-04
Maximum Detected	0.0738
Percent Non-Detects	**73.49%**
Minimum Non-detect	3.36E-04
Maximum Non-detect	0.00374
Mean of Detected Data	0.00814
Median of Detected Data	0.00243
Variance of Detected Data	2.63E-04
SD of Detected Data	0.0162
CV of Detected Data	1.991
Skewness of Detected Data	3.585
Mean of Detected log data	-5.742
SD of Detected Log data	1.237

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	76
Number treated as Detected	7
Single DL Percent Detection	91.57%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00253
SD	0.00882
Standard Error of Mean	9.91E-04
95% KM (t) UCL	0.00418
95% KM (z) UCL	0.00416
95% KM (BCA) UCL	0.00487
95% KM (Percentile Bootstrap) UCL	0.00446
95% KM (Chebyshev) UCL	0.00685
97.5% KM (Chebyshev) UCL	**0.00872**
99% KM (Chebyshev) UCL	0.0124

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Endrin ketone

Total Number of Data	83
Number of Non-Detect Data	66
Number of Detected Data	**17**
Minimum Detected	0.00123
Maximum Detected	0.02
Percent Non-Detects	**79.52%**
Minimum Non-detect	4.26E-04
Maximum Non-detect	0.021
Mean of Detected Data	0.00614
Median of Detected Data	0.0041
Variance of Detected Data	2.68E-05
SD of Detected Data	0.00518
CV of Detected Data	0.844
Skewness of Detected Data	1.296
Mean of Detected log data	-5.439
SD of Detected Log data	0.881

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	83
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00225
SD	0.00303
Standard Error of Mean	3.45E-04
95% KM (t) UCL	0.00283
95% KM (z) UCL	0.00282
95% KM (BCA) UCL	0.00319
95% KM (Percentile Bootstrap) UCL	0.00297
95% KM (Chebyshev) UCL	0.00376
97.5% KM (Chebyshev) UCL	**0.00441**
99% KM (Chebyshev) UCL	0.00569

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Fluoranthene

Total Number of Data	83
Number of Non-Detect Data	24
Number of Detected Data	**59**
Minimum Detected	0.0133
Maximum Detected	14.2
Percent Non-Detects	**28.92%**
Minimum Non-detect	0.0107
Maximum Non-detect	0.117
Mean of Detected Data	1.119
Median of Detected Data	0.24

Variance of Detected Data	4.976
SD of Detected Data	2.231
CV of Detected Data	1.994
Skewness of Detected Data	4.072
Mean of Detected log data	-1.32
SD of Detected Log data	1.802

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	47
Number treated as Detected	36
Single DL Percent Detection	56.63%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.8
SD	1.931
Standard Error of Mean	0.214
95% KM (t) UCL	1.155
95% KM (z) UCL	1.151
95% KM (BCA) UCL	1.188
95% KM (Percentile Bootstrap) UCL	1.157
95% KM (Chebyshev) UCL	1.731
97.5% KM (Chebyshev) UCL	**2.135**
99% KM (Chebyshev) UCL	2.926

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Fluorene

Total Number of Data	83
Number of Non-Detect Data	55
Number of Detected Data	**28**
Minimum Detected	0.00945
Maximum Detected	1.11
Percent Non-Detects	**66.27%**
Minimum Non-detect	0.0086
Maximum Non-detect	0.0962

Mean of Detected Data	0.133
Median of Detected Data	0.0693
Variance of Detected Data	0.059
SD of Detected Data	0.243
CV of Detected Data	1.829
Skewness of Detected Data	3.384
Mean of Detected log data	-2.823
SD of Detected Log data	1.177

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	74
Number treated as Detected	9
Single DL Percent Detection	89.16%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0518
SD	0.15
Standard Error of Mean	0.0168
95% KM (t) UCL	0.0797
95% KM (z) UCL	0.0794
95% KM (BCA) UCL	0.0885
95% KM (Percentile Bootstrap) UCL	0.0819
95% KM (Chebyshev) UCL	0.125
97.5% KM (Chebyshev) UCL	**0.157**
99% KM (Chebyshev) UCL	0.219

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

gamma-Chlordane

Total Number of Data	83
Number of Non-Detect Data	75
Number of Detected Data	**8**
Minimum Detected	7.10E-04
Maximum Detected	0.0156
Percent Non-Detects	**90.36%**
Minimum Non-detect	2.20E-04
Maximum Non-detect	0.011
Mean of Detected Data	0.00604
Median of Detected Data	0.00376
Variance of Detected Data	3.27E-05
SD of Detected Data	0.00572
CV of Detected Data	0.948
Skewness of Detected Data	1.091
Mean of Detected log data	-5.575
SD of Detected Log data	1.109

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	81
Number treated as Detected	2
Single DL Percent Detection	97.59%

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00123
SD	0.00229
Standard Error of Mean	2.69E-04
95% KM (t) UCL	0.00167
95% KM (z) UCL	0.00167
95% KM (BCA) UCL	0.00414
95% KM (Percentile Bootstrap) UCL	0.00381
95% KM (Chebyshev) UCL	0.0024
97.5% KM (Chebyshev) UCL	**0.0029**
99% KM (Chebyshev) UCL	0.0039

Data appear Normal (0.05)
May want to try Normal UCLs

Indeno(1,2,3-cd)pyrene

Total Number of Data	83
Number of Non-Detect Data	20
Number of Detected Data	**63**
Minimum Detected	0.0634
Maximum Detected	6.49
Percent Non-Detects	**24.10%**
Minimum Non-detect	0.0142
Maximum Non-detect	0.158
Mean of Detected Data	0.616
Median of Detected Data	0.165
Variance of Detected Data	1.079
SD of Detected Data	1.039
CV of Detected Data	1.687
Skewness of Detected Data	3.54
Mean of Detected log data	-1.365
SD of Detected Log data	1.245

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	51
Number treated as Detected	32
Single DL Percent Detection	61.45%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.483
SD	0.928
Standard Error of Mean	0.103
95% KM (t) UCL	0.654
95% KM (z) UCL	0.652
95% KM (BCA) UCL	0.68
95% KM (Percentile Bootstrap) UCL	0.661
95% KM (Chebyshev) UCL	0.931
97.5% KM (Chebyshev) UCL	1.124
99% KM (Chebyshev) UCL	1.505

Potential UCL to Use

95% KM (Chebyshev) UCL	**0.931**

Iron

Number of Valid Observations	83
Number of Distinct Observations	73
Minimum	3450
Maximum	77100
Mean	16285
Median	13400
SD	11193
Variance	1.25E+08
Coefficient of Variation	0.687
Skewness	3.11
Mean of log data	9.548
SD of log data	0.52
95% Useful UCLs	
Student's-t UCL	18329
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	18754
95% Modified-t UCL	18399
Non-Parametric UCLs	
95% CLT UCL	18306
95% Jackknife UCL	18329
95% Standard Bootstrap UCL	18305
95% Bootstrap-t UCL	19144
95% Hall's Bootstrap UCL	19421
95% Percentile Bootstrap UCL	18450
95% BCA Bootstrap UCL	18967
95% Chebyshev(Mean, Sd) UCL	21640
97.5% Chebyshev(Mean, Sd) UCL	**23957**
99% Chebyshev(Mean, Sd) UCL	28509

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Lead

Number of Valid Observations	83
Number of Distinct Observations	80
Minimum	2.82
Maximum	643
Mean	69.61
Median	34.4
SD	112.8
Variance	12720
Coefficient of Variation	1.62
Skewness	3.653
Mean of log data	3.584
SD of log data	1.077
95% Useful UCLs	
Student's-t UCL	90.2
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	95.27

95% Modified-t UCL	91.03

Non-Parametric UCLs	
95% CLT UCL	89.97
95% Jackknife UCL	90.2
95% Standard Bootstrap UCL	89.8
95% Bootstrap-t UCL	101.1
95% Hall's Bootstrap UCL	96.41
95% Percentile Bootstrap UCL	91.07
95% BCA Bootstrap UCL	97.2
95% Chebyshev(Mean, Sd) UCL	123.6
97.5% Chebyshev(Mean, Sd) UCL	**146.9**
99% Chebyshev(Mean, Sd) UCL	192.8

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Lithium

Number of Valid Observations	83
Number of Distinct Observations	80
Minimum	0.65
Maximum	28
Mean	7.856
Median	6.44
SD	5.715
Variance	32.67
Coefficient of Variation	0.728
Skewness	1.032
Mean of log data	1.76
SD of log data	0.847

95% Useful UCLs	
Student's-t UCL	8.899

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	8.963
95% Modified-t UCL	8.911

Non-Parametric UCLs	
95% CLT UCL	8.887
95% Jackknife UCL	8.899
95% Standard Bootstrap UCL	8.865
95% Bootstrap-t UCL	9.016
95% Hall's Bootstrap UCL	8.939
95% Percentile Bootstrap UCL	8.92
95% BCA Bootstrap UCL	9.002
95% Chebyshev(Mean, Sd) UCL	10.59
97.5% Chebyshev(Mean, Sd) UCL	**11.77**
99% Chebyshev(Mean, Sd) UCL	14.1

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Manganese

Number of Valid Observations	83
Number of Distinct Observations	71
Minimum	59.3

Maximum	892
Mean	257.4
Median	224
SD	129.3
Variance	16726
Coefficient of Variation	0.502
Skewness	2.305
Mean of log data	5.455
SD of log data	0.426

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	281.1
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	284.6
95% Modified-t UCL	281.7
Non-Parametric UCLs	
95% CLT UCL	280.8
95% Jackknife UCL	281.1
95% Standard Bootstrap UCL	280.3
95% Bootstrap-t UCL	287
95% Hall's Bootstrap UCL	287.4
95% Percentile Bootstrap UCL	280.8
95% BCA Bootstrap UCL	285.5
95% Chebyshev(Mean, Sd) UCL	319.3
97.5% Chebyshev(Mean, Sd) UCL	346.1
99% Chebyshev(Mean, Sd) UCL	398.7
Potential UCL to Use	
Use 95% Student's-t UCL	281.1
Or 95% Modified-t UCL	**281.7**

Mercury

Total Number of Data	83
Number of Non-Detect Data	46
Number of Detected Data	**37**
Minimum Detected	0.0032
Maximum Detected	0.66
Percent Non-Detects	**55.42%**
Minimum Non-detect	0.002
Maximum Non-detect	0.048
Mean of Detected Data	0.0447
Median of Detected Data	0.019
Variance of Detected Data	0.0119
SD of Detected Data	0.109
CV of Detected Data	2.445
Skewness of Detected Data	5.279
Mean of Detected log data	-4.004
SD of Detected Log data	1.162

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	76
Number treated as Detected	7

Single DL Percent Detection	91.57%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0222
SD	0.0748
Standard Error of Mean	0.00832
95% KM (t) UCL	0.0361
95% KM (z) UCL	0.0359
95% KM (BCA) UCL	0.0378
95% KM (Percentile Bootstrap) UCL	0.0375
95% KM (Chebyshev) UCL	0.0585
97.5% KM (Chebyshev) UCL	**0.0742**
99% KM (Chebyshev) UCL	0.105

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Molybdenum

Total Number of Data	83
Number of Non-Detect Data	12
Number of Detected Data	**71**
Minimum Detected	0.098
Maximum Detected	8.42
Percent Non-Detects	**14.46%**
Minimum Non-detect	0.068
Maximum Non-detect	0.078
Mean of Detected Data	1.521
Median of Detected Data	1
Variance of Detected Data	2.632
SD of Detected Data	1.622
CV of Detected Data	1.066
Skewness of Detected Data	2.021
Mean of Detected log data	-0.11
SD of Detected Log data	1.096

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	1.096
Mean	1.067
SD	0.956
95% Winsor (t) UCL	1.243

Kaplan Meier (KM) Method	
Mean	1.315
SD	1.572
Standard Error of Mean	0.174
95% KM (t) UCL	1.604
95% KM (z) UCL	1.601

95% KM (BCA) UCL	1.611
95% KM (Percentile Bootstrap) UCL	1.617
95% KM (Chebyshev) UCL	2.073
97.5% KM (Chebyshev) UCL	**2.4**
99% KM (Chebyshev) UCL	3.044

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Nickel

Number of Valid Observations	83
Number of Distinct Observations	67
Minimum	2.84
Maximum	36.7
Mean	11.64
Median	11.2
SD	4.938
Variance	24.38
Coefficient of Variation	0.424
Skewness	1.825
Mean of log data	2.373
SD of log data	0.411
95% Useful UCLs	
Student's-t UCL	12.54
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	12.65
95% Modified-t UCL	12.56
Non-Parametric UCLs	
95% CLT UCL	12.53
95% Jackknife UCL	12.54
95% Standard Bootstrap UCL	12.53
95% Bootstrap-t UCL	12.7
95% Hall's Bootstrap UCL	12.84
95% Percentile Bootstrap UCL	12.58
95% BCA Bootstrap UCL	12.7
95% Chebyshev(Mean, Sd) UCL	14
97.5% Chebyshev(Mean, Sd) UCL	**15.02**
99% Chebyshev(Mean, Sd) UCL	17.03

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Phenanthrene

Total Number of Data	83
Number of Non-Detect Data	26
Number of Detected Data	**57**
Minimum Detected	0.0139
Maximum Detected	12.6
Percent Non-Detects	**31.33%**
Minimum Non-detect	0.0115
Maximum Non-detect	0.122
Mean of Detected Data	0.74
Median of Detected Data	0.154

Variance of Detected Data	3.32
SD of Detected Data	1.822
CV of Detected Data	2.463
Skewness of Detected Data	5.422
Mean of Detected log data	-1.59
SD of Detected Log data	1.565

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	51
Number treated as Detected	32
Single DL Percent Detection	61.45%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.513
SD	1.534
Standard Error of Mean	0.17
95% KM (t) UCL	0.796
95% KM (z) UCL	0.793
95% KM (BCA) UCL	0.814
95% KM (Percentile Bootstrap) UCL	0.825
95% KM (Chebyshev) UCL	1.254
97.5% KM (Chebyshev) UCL	**1.574**
99% KM (Chebyshev) UCL	2.203

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Pyrene

Total Number of Data	83
Number of Non-Detect Data	26
Number of Detected Data	**57**
Minimum Detected	0.0121
Maximum Detected	8.47
Percent Non-Detects	**31.33%**
Minimum Non-detect	0.0111
Maximum Non-detect	0.3

Mean of Detected Data	0.765
Median of Detected Data	0.206
Variance of Detected Data	1.966
SD of Detected Data	1.402
CV of Detected Data	1.832
Skewness of Detected Data	3.609
Mean of Detected log data	-1.517
SD of Detected Log data	1.658

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	62
Number treated as Detected	21
Single DL Percent Detection	74.70%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.532
SD	1.203
Standard Error of Mean	0.133
95% KM (t) UCL	0.753
95% KM (z) UCL	0.751
95% KM (BCA) UCL	0.781
95% KM (Percentile Bootstrap) UCL	0.772
95% KM (Chebyshev) UCL	1.112
97.5% KM (Chebyshev) UCL	1.363
99% KM (Chebyshev) UCL	1.857

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Selenium

Total Number of Data **83**

Dataset has no Detected Values.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.96

Silver

Total Number of Data **83**

Dataset has no Detected Values.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 1.98

Strontium

Number of Valid Observations	83
Number of Distinct Observations	76
Minimum	16.5
Maximum	527
Mean	70.61
Median	57.3
SD	63.98
Variance	4094
Coefficient of Variation	0.906
Skewness	5.044
Mean of log data	4.06
SD of log data	0.583

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	82.29

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	86.31
95% Modified-t UCL	82.94
Non-Parametric UCLs	
95% CLT UCL	82.16
95% Jackknife UCL	82.29
95% Standard Bootstrap UCL	82.12
95% Bootstrap-t UCL	91.51
95% Hall's Bootstrap UCL	139.9
95% Percentile Bootstrap UCL	82.73
95% BCA Bootstrap UCL	88.37
95% Chebyshev(Mean, Sd) UCL	101.2
97.5% Chebyshev(Mean, Sd) UCL	114.5
99% Chebyshev(Mean, Sd) UCL	140.5
Potential UCL to Use	
Use 95% Chebyshev (Mean, Sd) UCL	**101.2**

Tin

Total Number of Data	83
Number of Non-Detect Data	64
Number of Detected Data	**19**
Minimum Detected	0.55
Maximum Detected	4.95
Percent Non-Detects	**77.11%**
Minimum Non-detect	0.46
Maximum Non-detect	1.02
Mean of Detected Data	1.666
Median of Detected Data	1.68
Variance of Detected Data	1.302
SD of Detected Data	1.141
CV of Detected Data	0.685
Skewness of Detected Data	1.434
Mean of Detected log data	0.301
SD of Detected Log data	0.671

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	72
Number treated as Detected	11
Single DL Percent Detection	86.75%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.806
SD	0.709
Standard Error of Mean	0.0799
95% KM (t) UCL	0.939
95% KM (z) UCL	0.938
95% KM (BCA) UCL	0.972
95% KM (Percentile Bootstrap) UCL	0.941

95% KM (Chebyshev) UCL	1.155
97.5% KM (Chebyshev) UCL	**1.305**
99% KM (Chebyshev) UCL	1.602

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Titanium

Number of Valid Observations	83
Number of Distinct Observations	71
Minimum	11.5
Maximum	645
Mean	29.8
Median	19.5
SD	69.4
Variance	4816
Coefficient of Variation	2.329
Skewness	8.71
Mean of log data	3.055
SD of log data	0.544

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	42.47
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	50.11
95% Modified-t UCL	43.68
Non-Parametric UCLs	
95% CLT UCL	42.33
95% Jackknife UCL	42.47
95% Standard Bootstrap UCL	42.36
95% Bootstrap-t UCL	93.11
95% Hall's Bootstrap UCL	87.11
95% Percentile Bootstrap UCL	44.76
95% BCA Bootstrap UCL	54.32
95% Chebyshev(Mean, Sd) UCL	63
97.5% Chebyshev(Mean, Sd) UCL	77.37
99% Chebyshev(Mean, Sd) UCL	105.6

Potential UCL to Use
Use 95% Chebyshev (Mean, Sd) UCL **63**

Vanadium

Number of Valid Observations	83
Number of Distinct Observations	67
Minimum	5.42
Maximum	45.6
Mean	13.76
Median	12.9
SD	6.248
Variance	39.04
Coefficient of Variation	0.454
Skewness	2.186
Mean of log data	2.538

SD of log data	0.404
95% Useful UCLs	
Student's-t UCL	14.9
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	15.06
95% Modified-t UCL	14.93
Non-Parametric UCLs	
95% CLT UCL	14.89
95% Jackknife UCL	14.9
95% Standard Bootstrap UCL	14.9
95% Bootstrap-t UCL	15.11
95% Hall's Bootstrap UCL	15.17
95% Percentile Bootstrap UCL	14.9
95% BCA Bootstrap UCL	15.07
95% Chebyshev(Mean, Sd) UCL	16.75
97.5% Chebyshev(Mean, Sd) UCL	**18.04**
99% Chebyshev(Mean, Sd) UCL	20.58

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Zinc

Number of Valid Observations	83
Number of Distinct Observations	81
Minimum	12.3
Maximum	4770
Mean	601.2
Median	455
SD	672.8
Variance	452606
Coefficient of Variation	1.119
Skewness	3.386
Mean of log data	5.837
SD of log data	1.203
95% Useful UCLs	
Student's-t UCL	724.1
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	752
95% Modified-t UCL	728.6
Non-Parametric UCLs	
95% CLT UCL	722.7
95% Jackknife UCL	724.1
95% Standard Bootstrap UCL	723.1
95% Bootstrap-t UCL	762.3
95% Hall's Bootstrap UCL	818.2
95% Percentile Bootstrap UCL	734.3
95% BCA Bootstrap UCL	771.3
95% Chebyshev(Mean, Sd) UCL	923.1
97.5% Chebyshev(Mean, Sd) UCL	**1062**
99% Chebyshev(Mean, Sd) UCL	1336

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

APPENDIX A-2

SOUTH OF MARLIN SOIL

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	C:\Users\Michael\ . . . . \Gulfco Superfund Site\revised HHRA\Gulfco Marlin South soil-all data_ProUCL input.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,3,5-Trimethylbenzene

Total Number of Data	83
Number of Non-Detect Data	74
Number of Detected Data	**9**
Minimum Detected	2.67E-04
Maximum Detected	4.36
Percent Non-Detects	**89.16%**
Minimum Non-detect	7.40E-05
Maximum Non-detect	0.0101
Mean of Detected Data	0.91
Median of Detected Data	0.00104
Variance of Detected Data	3.269
SD of Detected Data	1.808
CV of Detected Data	1.987
Skewness of Detected Data	1.644
Mean of Detected log data	-5.26
SD of Detected Log data	3.875

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	81
Number treated as Detected	2
Single DL Percent Detection	97.59%

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0989
SD	0.629
Standard Error of Mean	0.0732
95% KM (t) UCL	0.221
95% KM (z) UCL	0.219
95% KM (BCA) UCL	0.243

95% KM (Percentile Bootstrap) UCL	0.243
95% KM (Chebyshev) UCL	0.418
97.5% KM (Chebyshev) UCL	0.556
99% KM (Chebyshev) UCL	0.827

Potential UCL to Use

97.5% KM (Chebyshev) UCL	**0.556**

2-Butanone

Total Number of Data	83
Number of Non-Detect Data	42
Number of Detected Data	**41**
Minimum Detected	9.92E-04
Maximum Detected	0.0226
Percent Non-Detects	**50.60%**
Minimum Non-detect	1.43E-04
Maximum Non-detect	0.12
Mean of Detected Data	0.00511
Median of Detected Data	0.00314
Variance of Detected Data	2.46E-05
SD of Detected Data	0.00496
CV of Detected Data	0.971
Skewness of Detected Data	1.975
Mean of Detected log data	-5.61
SD of Detected Log data	0.774

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	83
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00329
SD	0.00401
Standard Error of Mean	4.58E-04
95% KM (t) UCL	0.00405
95% KM (z) UCL	0.00404
95% KM (BCA) UCL	0.00425
95% KM (Percentile Bootstrap) UCL	0.00414
95% KM (Chebyshev) UCL	0.00528
97.5% KM (Chebyshev) UCL	0.00615
99% KM (Chebyshev) UCL	0.00785

Potential UCL to Use

95% KM (t) UCL	**0.00405**
95% KM (% Bootstrap) UCL	**0.00414**

2-Hexanone

Total Number of Data	83
Number of Non-Detect Data	75
Number of Detected Data	**8**
Minimum Detected	0.00109
Maximum Detected	0.0207
Percent Non-Detects	**90.36%**
Minimum Non-detect	3.78E-04
Maximum Non-detect	0.317
Mean of Detected Data	0.00653
Median of Detected Data	0.00452
Variance of Detected Data	4.39E-05
SD of Detected Data	0.00662
CV of Detected Data	1.015
Skewness of Detected Data	1.707
Mean of Detected log data	-5.449
SD of Detected Log data	0.982

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	83
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00165
SD	0.0026
Standard Error of Mean	3.16E-04
95% KM (t) UCL	0.00218
95% KM (z) UCL	0.00218
95% KM (BCA) UCL	0.00471
95% KM (Percentile Bootstrap) UCL	0.00417
95% KM (Chebyshev) UCL	0.00303
97.5% KM (Chebyshev) UCL	**0.00363**
99% KM (Chebyshev) UCL	0.0048

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

2-Methylnaphthalene

Total Number of Data	166
Number of Non-Detect Data	134
Number of Detected Data	**32**
Minimum Detected	0.0106
Maximum Detected	7.21
Percent Non-Detects	**80.72%**
Minimum Non-detect	0.00946
Maximum Non-detect	0.205
Mean of Detected Data	0.315
Median of Detected Data	0.0469
Variance of Detected Data	1.597
SD of Detected Data	1.264
CV of Detected Data	4.009
Skewness of Detected Data	5.582
Mean of Detected log data	-2.811
SD of Detected Log data	1.367

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	161
Number treated as Detected	5
Single DL Percent Detection	96.99%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0697
SD	0.559
Standard Error of Mean	0.0441
95% KM (t) UCL	0.143
95% KM (z) UCL	0.142
95% KM (BCA) UCL	0.16
95% KM (Percentile Bootstrap) UCL	0.155
95% KM (Chebyshev) UCL	0.262
97.5% KM (Chebyshev) UCL	0.345
99% KM (Chebyshev) UCL	0.508
Potential UCL to Use	
95% KM (BCA) UCL	**0.16**

4,4'-DDD

Total Number of Data	166
Number of Non-Detect Data	145
Number of Detected Data	**21**
Minimum Detected	3.69E-04

Maximum Detected	1.12
Percent Non-Detects	**87.35%**
Minimum Non-detect	2.35E-04
Maximum Non-detect	0.0125
Mean of Detected Data	0.0588
Median of Detected Data	0.00372
Variance of Detected Data	0.0592
SD of Detected Data	0.243
CV of Detected Data	4.139
Skewness of Detected Data	4.577
Mean of Detected log data	-5.478
SD of Detected Log data	1.706

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	161
Number treated as Detected	5
Single DL Percent Detection	96.99%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00776
SD	0.0866
Standard Error of Mean	0.00689
95% KM (t) UCL	0.0192
95% KM (z) UCL	0.0191
95% KM (BCA) UCL	0.0276
95% KM (Percentile Bootstrap) UCL	0.0214
95% KM (Chebyshev) UCL	0.0378
97.5% KM (Chebyshev) UCL	**0.0508**
99% KM (Chebyshev) UCL	0.0763

Potential UCL to Use ________

4,4'-DDE

Total Number of Data	166
Number of Non-Detect Data	144
Number of Detected Data	**22**
Minimum Detected	4.28E-04
Maximum Detected	0.0693
Percent Non-Detects	**86.75%**
Minimum Non-detect	3.26E-04
Maximum Non-detect	0.0373
Mean of Detected Data	0.00905
Median of Detected Data	0.00197
Variance of Detected Data	3.69E-04
SD of Detected Data	0.0192

CV of Detected Data	2.121
Skewness of Detected Data	2.781
Mean of Detected log data	-6
SD of Detected Log data	1.459

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	164
Number treated as Detected	2
Single DL Percent Detection	98.80%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00158
SD	0.00743
Standard Error of Mean	5.91E-04
95% KM (t) UCL	0.00256
95% KM (z) UCL	0.00256
95% KM (BCA) UCL	0.00281
95% KM (Percentile Bootstrap) UCL	0.00259
95% KM (Chebyshev) UCL	0.00416
97.5% KM (Chebyshev) UCL	0.00527
99% KM (Chebyshev) UCL	0.00746

Potential UCL to Use

95% KM (BCA) UCL	**0.00281**

4,4'-DDT

Total Number of Data	166
Number of Non-Detect Data	98
Number of Detected Data	**68**
Minimum Detected	2.81E-04
Maximum Detected	0.113
Percent Non-Detects	**59.04%**
Minimum Non-detect	1.25E-04
Maximum Non-detect	0.0143

Mean of Detected Data	0.0087
Median of Detected Data	0.00275
Variance of Detected Data	2.75E-04
SD of Detected Data	0.0166
CV of Detected Data	1.905
Skewness of Detected Data	4.44
Mean of Detected log data	-5.829
SD of Detected Log data	1.491

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	154
Number treated as Detected	12
Single DL Percent Detection	92.77%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00375
SD	0.0113
Standard Error of Mean	8.85E-04
95% KM (t) UCL	0.00521
95% KM (z) UCL	0.0052
95% KM (BCA) UCL	0.00548
95% KM (Percentile Bootstrap) UCL	0.00529
95% KM (Chebyshev) UCL	0.0076
97.5% KM (Chebyshev) UCL	**0.00927**
99% KM (Chebyshev) UCL	0.0125

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

Acenaphthene

Total Number of Data	166
Number of Non-Detect Data	131
Number of Detected Data	**35**
Minimum Detected	0.0113
Maximum Detected	1.69
Percent Non-Detects	**78.92%**
Minimum Non-detect	0.0087
Maximum Non-detect	0.189
Mean of Detected Data	0.161
Median of Detected Data	0.0787
Variance of Detected Data	0.0894
SD of Detected Data	0.299
CV of Detected Data	1.852
Skewness of Detected Data	4.309
Mean of Detected log data	-2.602
SD of Detected Log data	1.192

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2; and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	160
Number treated as Detected	6
Single DL Percent Detection	96.39%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0433
SD	0.149
Standard Error of Mean	0.0117
95% KM (t) UCL	0.0627
95% KM (z) UCL	0.0626
95% KM (BCA) UCL	0.0676
95% KM (Percentile Bootstrap) UCL	0.0635
95% KM (Chebyshev) UCL	0.0944
97.5% KM (Chebyshev) UCL	**0.116**
99% KM (Chebyshev) UCL	0.16

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

Acenaphthylene

Total Number of Data	166
Number of Non-Detect Data	129
Number of Detected Data	**37**
Minimum Detected	0.0172
Maximum Detected	1.2
Percent Non-Detects	**77.71%**
Minimum Non-detect	0.00986
Maximum Non-detect	0.128
Mean of Detected Data	0.156
Median of Detected Data	0.0517
Variance of Detected Data	0.084
SD of Detected Data	0.29
CV of Detected Data	1.862
Skewness of Detected Data	3.012
Mean of Detected log data	-2.69
SD of Detected Log data	1.124

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	156
Number treated as Detected	10
Single DL Percent Detection	93.98%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0484
SD	0.147
Standard Error of Mean	0.0116
95% KM (t) UCL	0.0675

95% KM (z) UCL	0.0674
95% KM (BCA) UCL	0.0719
95% KM (Percentile Bootstrap) UCL	0.0688
95% KM (Chebyshev) UCL	0.0987
97.5% KM (Chebyshev) UCL	0.12
99% KM (Chebyshev) UCL	0.163

Potential UCL to Use

95% KM (BCA) UCL	**0.0719**

Acetone

Total Number of Data	83
Number of Non-Detect Data	73
Number of Detected Data	**10**
Minimum Detected	0.031
Maximum Detected	0.16
Percent Non-Detects	**87.95%**
Minimum Non-detect	1.71E-04
Maximum Non-detect	0.144
Mean of Detected Data	0.08
Median of Detected Data	0.0582
Variance of Detected Data	0.00277
SD of Detected Data	0.0526
CV of Detected Data	0.658
Skewness of Detected Data	0.756
Mean of Detected log data	-2.72
SD of Detected Log data	0.655

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	81
Number treated as Detected	2
Single DL Percent Detection	97.59%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.037
SD	0.0236
Standard Error of Mean	0.00274
95% KM (t) UCL	0.0415
95% KM (z) UCL	0.0415
95% KM (BCA) UCL	0.0559
95% KM (Percentile Bootstrap) UCL	0.0448
95% KM (Chebyshev) UCL	0.0489
97.5% KM (Chebyshev) UCL	**0.0541**
99% KM (Chebyshev) UCL	0.0642

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Aluminum

Number of Valid Observations	166
Number of Distinct Observations	149
Minimum	414
Maximum	15700
Mean	6452
Median	6175
SD	3601
Variance	12965507
Coefficient of Variation	0.558
Skewness	0.362
Mean of log data	8.565
SD of log data	0.718
95% Useful UCLs	
Student's-t UCL	6914
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	6920
95% Modified-t UCL	6916
Non-Parametric UCLs	
95% CLT UCL	6912
95% Jackknife UCL	6914
95% Standard Bootstrap UCL	6908
95% Bootstrap-t UCL	6929
95% Hall's Bootstrap UCL	6936
95% Percentile Bootstrap UCL	6914
95% BCA Bootstrap UCL	6917
95% Chebyshev(Mean, Sd) UCL	7670
97.5% Chebyshev(Mean, Sd) UCL	**8197**
99% Chebyshev(Mean, Sd) UCL	9233

Data appear Normal (0.05)

May want to try Normal UCLs

Anthracene

Total Number of Data	166
Number of Non-Detect Data	102
Number of Detected Data	**64**
Minimum Detected	0.0112
Maximum Detected	2.46
Percent Non-Detects	**61.45%**
Minimum Non-detect	0.00982
Maximum Non-detect	0.207
Mean of Detected Data	0.212
Median of Detected Data	0.0936
Variance of Detected Data	0.142

SD of Detected Data	0.377
CV of Detected Data	1.781
Skewness of Detected Data	4.103
Mean of Detected log data	-2.472
SD of Detected Log data	1.358

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	150
Number treated as Detected	16
Single DL Percent Detection	90.36%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0889
SD	0.252
Standard Error of Mean	0.0197
95% KM (t) UCL	0.122
95% KM (z) UCL	0.121
95% KM (BCA) UCL	0.124
95% KM (Percentile Bootstrap) UCL	0.122
95% KM (Chebyshev) UCL	0.175
97.5% KM (Chebyshev) UCL	0.212
99% KM (Chebyshev) UCL	0.285

Potential UCL to Use

95% KM (BCA) UCL	**0.124**

Antimony

Total Number of Data	166
Number of Non-Detect Data	101
Number of Detected Data	**65**
Minimum Detected	0.94
Maximum Detected	5.51
Percent Non-Detects	**60.84%**
Minimum Non-detect	0.19
Maximum Non-detect	1.04

Mean of Detected Data	2.249
Median of Detected Data	2.13
Variance of Detected Data	0.816
SD of Detected Data	0.903
CV of Detected Data	0.402
Skewness of Detected Data	1.372
Mean of Detected log data	0.739
SD of Detected Log data	0.379

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	103
Number treated as Detected	63
Single DL Percent Detection	62.05%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	1.452
SD	0.85
Standard Error of Mean	0.0665
95% KM (t) UCL	1.562
95% KM (z) UCL	1.562
95% KM (BCA) UCL	1.647
95% KM (Percentile Bootstrap) UCL	1.612
95% KM (Chebyshev) UCL	1.742
97.5% KM (Chebyshev) UCL	**1.868**
99% KM (Chebyshev) UCL	2.114

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Aroclor-1254

Total Number of Data	170
Number of Non-Detect Data	145
Number of Detected Data	**25**
Minimum Detected	0.0109
Maximum Detected	11.5
Percent Non-Detects	**85.29%**
Minimum Non-detect	0.00325
Maximum Non-detect	0.0391

Mean of Detected Data	1.407
Median of Detected Data	0.172
Variance of Detected Data	7.459
SD of Detected Data	2.731
CV of Detected Data	1.941
Skewness of Detected Data	2.874
Mean of Detected log data	-1.085
SD of Detected Log data	1.783

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	148
Number treated as Detected	22
Single DL Percent Detection	87.06%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.216
SD	1.139
Standard Error of Mean	0.0892
95% KM (t) UCL	0.364
95% KM (z) UCL	0.363
95% KM (BCA) UCL	0.427
95% KM (Percentile Bootstrap) UCL	0.376
95% KM (Chebyshev) UCL	0.605
97.5% KM (Chebyshev) UCL	**0.773**
99% KM (Chebyshev) UCL	1.104

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

Arsenic

Total Number of Data	166
Number of Non-Detect Data	27
Number of Detected Data	**139**
Minimum Detected	0.23
Maximum Detected	24.3
Percent Non-Detects	**16.27%**
Minimum Non-detect	0.17
Maximum Non-detect	1.44
Mean of Detected Data	3.918
Median of Detected Data	3.09
Variance of Detected Data	10.64
SD of Detected Data	3.261
CV of Detected Data	0.832
Skewness of Detected Data	2.783
Mean of Detected log data	1.079
SD of Detected Log data	0.803

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	47
Number treated as Detected	119
Single DL Percent Detection	28.31%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	28.31%
Mean	2.696
SD	1.062
95% Winsor (t) UCL	2.834

Kaplan Meier (KM) Method

Mean	3.331
SD	3.259
Standard Error of Mean	0.254
95% KM (t) UCL	3.752
95% KM (z) UCL	3.749
95% KM (BCA) UCL	3.777
95% KM (Percentile Bootstrap) UCL	3.77
95% KM (Chebyshev) UCL	4.438
97.5% KM (Chebyshev) UCL	**4.917**
99% KM (Chebyshev) UCL	5.858

Data follow Appr. Gamma Distribution (0.05)

May want to try Gamma UCLs

Barium

Number of Valid Observations	166
Number of Distinct Observations	135
Minimum	18.6
Maximum	2180
Mean	237.4
Median	139.5
SD	274.8
Variance	75535
Coefficient of Variation	1.158
Skewness	3.69
Mean of log data	5.104
SD of log data	0.789

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	272.7
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	279
95% Modified-t UCL	273.7
Non-Parametric UCLs	
95% CLT UCL	272.5
95% Jackknife UCL	272.7
95% Standard Bootstrap UCL	273.3
95% Bootstrap-t UCL	284
95% Hall's Bootstrap UCL	287.5
95% Percentile Bootstrap UCL	272.3
95% BCA Bootstrap UCL	279.3
95% Chebyshev(Mean, Sd) UCL	330.4
97.5% Chebyshev(Mean, Sd) UCL	370.6
99% Chebyshev(Mean, Sd) UCL	449.6
Potential UCL to Use	
Use 95% Chebyshev (Mean, Sd) UCL	**330.4**

Benzene

Total Number of Data	83
Number of Non-Detect Data	11
Number of Detected Data	**72**
Minimum Detected	3.39E-04
Maximum Detected	0.0221
Percent Non-Detects	**13.25%**
Minimum Non-detect	9.50E-05
Maximum Non-detect	0.0399

Mean of Detected Data	0.00425
Median of Detected Data	0.00378
Variance of Detected Data	1.01E-05
SD of Detected Data	0.00318
CV of Detected Data	0.748
Skewness of Detected Data	2.653
Mean of Detected log data	-5.736
SD of Detected Log data	0.821

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	83
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00389
SD	0.00315
Standard Error of Mean	3.52E-04
95% KM (t) UCL	0.00448
95% KM (z) UCL	0.00447
95% KM (BCA) UCL	0.00453
95% KM (Percentile Bootstrap) UCL	0.0045
95% KM (Chebyshev) UCL	0.00543
97.5% KM (Chebyshev) UCL	**0.00609**
99% KM (Chebyshev) UCL	0.0074

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Benzo(a)anthracene

Total Number of Data	166
Number of Non-Detect Data	122
Number of Detected Data	**44**
Minimum Detected	0.0118
Maximum Detected	5.02

Percent Non-Detects	**73.49%**
Minimum Non-detect	0.0089
Maximum Non-detect	0.193
Mean of Detected Data	0.98
Median of Detected Data	0.516
Variance of Detected Data	1.538
SD of Detected Data	1.24
CV of Detected Data	1.265
Skewness of Detected Data	1.955
Mean of Detected log data	-0.967
SD of Detected Log data	1.624

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	135
Number treated as Detected	31
Single DL Percent Detection	81.33%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.269
SD	0.762
Standard Error of Mean	0.0598
95% KM (t) UCL	0.368
95% KM (z) UCL	0.367
95% KM (BCA) UCL	0.39
95% KM (Percentile Bootstrap) UCL	0.378
95% KM (Chebyshev) UCL	0.53
97.5% KM (Chebyshev) UCL	**0.643**
99% KM (Chebyshev) UCL	0.864

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Benzo(a)pyrene

Total Number of Data	166
Number of Non-Detect Data	53
Number of Detected Data	**113**
Minimum Detected	0.00999
Maximum Detected	4.88
Percent Non-Detects	**31.93%**
Minimum Non-detect	0.00886
Maximum Non-detect	0.0984
Mean of Detected Data	0.506
Median of Detected Data	0.0666
Variance of Detected Data	0.998
SD of Detected Data	0.999

CV of Detected Data	1.973
Skewness of Detected Data	2.807
Mean of Detected log data	-2.255
SD of Detected Log data	1.801

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	115
Number treated as Detected	51
Single DL Percent Detection	69.28%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.348
SD	0.853
Standard Error of Mean	0.0665
95% KM (t) UCL	0.458
95% KM (z) UCL	0.457
95% KM (BCA) UCL	0.458
95% KM (Percentile Bootstrap) UCL	0.464
95% KM (Chebyshev) UCL	0.638
97.5% KM (Chebyshev) UCL	**0.763**
99% KM (Chebyshev) UCL	1.009

Potential UCL to Use ________

Benzo(b)fluoranthene

Total Number of Data	166
Number of Non-Detect Data	64
Number of Detected Data	**102**
Minimum Detected	0.0408
Maximum Detected	5.97
Percent Non-Detects	**38.55%**
Minimum Non-detect	0.00677
Maximum Non-detect	0.167

Mean of Detected Data	0.75
Median of Detected Data	0.206
Variance of Detected Data	1.497
SD of Detected Data	1.223
CV of Detected Data	1.63
Skewness of Detected Data	2.609
Mean of Detected log data	-1.254
SD of Detected Log data	1.353

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	109

Number treated as Detected	57
Single DL Percent Detection	65.66%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.477
SD	1.015
Standard Error of Mean	0.0791
95% KM (t) UCL	0.608
95% KM (z) UCL	0.608
95% KM (BCA) UCL	0.622
95% KM (Percentile Bootstrap) UCL	0.611
95% KM (Chebyshev) UCL	0.822
97.5% KM (Chebyshev) UCL	0.972
99% KM (Chebyshev) UCL	1.265

Potential UCL to Use	
95% KM (Chebyshev) UCL	**0.822**

Benzo(g,h,i)perylene

Total Number of Data	166
Number of Non-Detect Data	91
Number of Detected Data	**75**
Minimum Detected	0.00989
Maximum Detected	4.24
Percent Non-Detects	**54.82%**
Minimum Non-detect	0.00887
Maximum Non-detect	2.9

Mean of Detected Data	0.46
Median of Detected Data	0.105
Variance of Detected Data	0.603
SD of Detected Data	0.776
CV of Detected Data	1.688
Skewness of Detected Data	2.724
Mean of Detected log data	-1.908
SD of Detected Log data	1.53

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	165
Number treated as Detected	1
Single DL Percent Detection	99.40%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.217
SD	0.565
Standard Error of Mean	0.0443
95% KM (t) UCL	0.291
95% KM (z) UCL	0.29
95% KM (BCA) UCL	0.294
95% KM (Percentile Bootstrap) UCL	0.296
95% KM (Chebyshev) UCL	0.41
97.5% KM (Chebyshev) UCL	**0.494**
99% KM (Chebyshev) UCL	0.658

Potential UCL to Use _______

Benzo(k)fluoranthene

Total Number of Data	166
Number of Non-Detect Data	121
Number of Detected Data	**45**
Minimum Detected	0.0158
Maximum Detected	4.25
Percent Non-Detects	**72.89%**
Minimum Non-detect	0.0137
Maximum Non-detect	0.296

Mean of Detected Data	0.537
Median of Detected Data	0.228
Variance of Detected Data	0.578
SD of Detected Data	0.76
CV of Detected Data	1.415
Skewness of Detected Data	2.959
Mean of Detected log data	-1.534
SD of Detected Log data	1.472

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	149
Number treated as Detected	17
Single DL Percent Detection	89.76%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.158
SD	0.455
Standard Error of Mean	0.0357
95% KM (t) UCL	0.217
95% KM (z) UCL	0.216
95% KM (BCA) UCL	0.228
95% KM (Percentile Bootstrap) UCL	0.223
95% KM (Chebyshev) UCL	0.313

97.5% KM (Chebyshev) UCL	**0.381**
99% KM (Chebyshev) UCL	0.513

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

Beryllium

Total Number of Data	166
Number of Non-Detect Data	1
Number of Detected Data	**165**
Minimum Detected	0.014
Maximum Detected	4.6
Percent Non-Detects	**0.60%**
Minimum Non-detect	0.0031
Maximum Non-detect	0.0031
Mean of Detected Data	0.468
Median of Detected Data	0.42
Variance of Detected Data	0.176
SD of Detected Data	0.419
CV of Detected Data	0.897
Skewness of Detected Data	5.967
Mean of Detected log data	-1.079
SD of Detected Log data	0.914

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	0.914
Mean	0.446
SD	0.281
95% Winsor (t) UCL	0.482
Kaplan Meier (KM) Method	
Mean	0.465
SD	0.418
Standard Error of Mean	0.0326
95% KM (t) UCL	0.519
95% KM (z) UCL	0.518
95% KM (BCA) UCL	0.525
95% KM (Percentile Bootstrap) UCL	0.521
95% KM (Chebyshev) UCL	0.607
97.5% KM (Chebyshev) UCL	0.668
99% KM (Chebyshev) UCL	0.789
Potential UCL to Use	
95% KM (BCA) UCL	**0.525**

Boron

Total Number of Data	166
Number of Non-Detect Data	95

Number of Detected Data	**71**
Minimum Detected	2.43
Maximum Detected	54.4
Percent Non-Detects	**57.23%**
Minimum Non-detect	0.95
Maximum Non-detect	15.3
Mean of Detected Data	9.924
Median of Detected Data	9.39
Variance of Detected Data	43.63
SD of Detected Data	6.605
CV of Detected Data	0.666
Skewness of Detected Data	4.557
Mean of Detected log data	2.158
SD of Detected Log data	0.518

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	164
Number treated as Detected	2
Single DL Percent Detection	98.80%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	5.675
SD	5.667
Standard Error of Mean	0.444
95% KM (t) UCL	6.41
95% KM (z) UCL	6.406
95% KM (BCA) UCL	6.674
95% KM (Percentile Bootstrap) UCL	6.505
95% KM (Chebyshev) UCL	7.611
97.5% KM (Chebyshev) UCL	8.449
99% KM (Chebyshev) UCL	10.09

Potential UCL to Use

95% KM (t) UCL	6.41
95% KM (% Bootstrap) UCL	**6.505**

Butyl benzyl phthalate

Total Number of Data	166
Number of Non-Detect Data	156
Number of Detected Data	**10**
Minimum Detected	0.0129
Maximum Detected	0.617
Percent Non-Detects	**93.98%**
Minimum Non-detect	0.0109
Maximum Non-detect	0.237

Mean of Detected Data	0.13
Median of Detected Data	0.04
Variance of Detected Data	0.0374
SD of Detected Data	0.193
CV of Detected Data	1.489
Skewness of Detected Data	2.178
Mean of Detected log data	-2.847
SD of Detected Log data	1.268

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	164
Number treated as Detected	2
Single DL Percent Detection	98.80%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0201
SD	0.0529
Standard Error of Mean	0.00433
95% KM (t) UCL	0.0273
95% KM (z) UCL	0.0272
95% KM (BCA) UCL	0.0439
95% KM (Percentile Bootstrap) UCL	0.0353
95% KM (Chebyshev) UCL	0.039
97.5% KM (Chebyshev) UCL	**0.0472**
99% KM (Chebyshev) UCL	0.0632

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

Cadmium

Total Number of Data	166
Number of Non-Detect Data	73
Number of Detected Data	**93**
Minimum Detected	0.023
Maximum Detected	9.71
Percent Non-Detects	**43.98%**
Minimum Non-detect	0.017
Maximum Non-detect	0.087

Mean of Detected Data	0.589
Median of Detected Data	0.33
Variance of Detected Data	1.174
SD of Detected Data	1.084
CV of Detected Data	1.838
Skewness of Detected Data	6.915
Mean of Detected log data	-1.032

SD of Detected Log data	0.913

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	80
Number treated as Detected	86
Single DL Percent Detection	48.19%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	48.19%
Mean	0.126
SD	0.0338
95% Winsor (t) UCL	0.131

Kaplan Meier (KM) Method	
Mean	0.34
SD	0.854
Standard Error of Mean	0.0667
95% KM (t) UCL	0.451
95% KM (z) UCL	0.45
95% KM (BCA) UCL	0.505
95% KM (Percentile Bootstrap) UCL	0.467
95% KM (Chebyshev) UCL	0.631
97.5% KM (Chebyshev) UCL	0.757
99% KM (Chebyshev) UCL	1.004

Potential UCL to Use	
95% KM (t) UCL	**0.451**
95% KM (% Bootstrap) UCL	**0.467**

Carbazole

Total Number of Data	166
Number of Non-Detect Data	124
Number of Detected Data	**42**
Minimum Detected	0.0104
Maximum Detected	1.54
Percent Non-Detects	**74.70%**
Minimum Non-detect	0.00864
Maximum Non-detect	0.187

Mean of Detected Data	0.151
Median of Detected Data	0.0857
Variance of Detected Data	0.0723
SD of Detected Data	0.269
CV of Detected Data	1.777
Skewness of Detected Data	3.938
Mean of Detected log data	-2.746
SD of Detected Log data	1.291

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	158
Number treated as Detected	8
Single DL Percent Detection	95.18%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0464
SD	0.147
Standard Error of Mean	0.0116
95% KM (t) UCL	0.0656
95% KM (z) UCL	0.0654
95% KM (BCA) UCL	0.0705
95% KM (Percentile Bootstrap) UCL	0.067
95% KM (Chebyshev) UCL	0.0968
97.5% KM (Chebyshev) UCL	**0.119**
99% KM (Chebyshev) UCL	0.161

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Carbon disulfide

Total Number of Data	83
Number of Non-Detect Data	70
Number of Detected Data	**13**
Minimum Detected	9.87E-04
Maximum Detected	0.028
Percent Non-Detects	**84.34%**
Minimum Non-detect	5.00E-05
Maximum Non-detect	0.0419

Mean of Detected Data	0.00521
Median of Detected Data	0.00299
Variance of Detected Data	5.05E-05
SD of Detected Data	0.00711
CV of Detected Data	1.364
Skewness of Detected Data	3.177
Mean of Detected log data	-5.705
SD of Detected Log data	0.881

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	83
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00167
SD	0.00313
Standard Error of Mean	3.60E-04
95% KM (t) UCL	0.00227
95% KM (z) UCL	0.00226
95% KM (BCA) UCL	0.00339
95% KM (Percentile Bootstrap) UCL	0.00269
95% KM (Chebyshev) UCL	0.00324
97.5% KM (Chebyshev) UCL	**0.00392**
99% KM (Chebyshev) UCL	0.00525

Data follow Appr. Gamma Distribution (0.05)

May want to try Gamma UCLs

Chromium

Number of Valid Observations	166
Number of Distinct Observations	144
Minimum	2.03
Maximum	136
Mean	13.53
Median	10.55
SD	12.49
Variance	156
Coefficient of Variation	0.923
Skewness	6.346
Mean of log data	2.41
SD of log data	0.582

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	15.13
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	15.63
95% Modified-t UCL	15.21
Non-Parametric UCLs	
95% CLT UCL	15.12
95% Jackknife UCL	15.13
95% Standard Bootstrap UCL	15.14
95% Bootstrap-t UCL	16.04
95% Hall's Bootstrap UCL	22.48
95% Percentile Bootstrap UCL	15.23
95% BCA Bootstrap UCL	15.68
95% Chebyshev(Mean, Sd) UCL	17.75
97.5% Chebyshev(Mean, Sd) UCL	19.58
99% Chebyshev(Mean, Sd) UCL	23.17

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL **17.75**

Chrysene

Total Number of Data	166
Number of Non-Detect Data	73
Number of Detected Data	**93**
Minimum Detected	0.00901
Maximum Detected	4.87
Percent Non-Detects	**43.98%**
Minimum Non-detect	0.00842
Maximum Non-detect	0.169
Mean of Detected Data	0.577
Median of Detected Data	0.139
Variance of Detected Data	0.978
SD of Detected Data	0.989
CV of Detected Data	1.714
Skewness of Detected Data	2.465
Mean of Detected log data	-1.859
SD of Detected Log data	1.688

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	125
Number treated as Detected	41
Single DL Percent Detection	75.30%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.328
SD	0.788
Standard Error of Mean	0.0615
95% KM (t) UCL	0.429
95% KM (z) UCL	0.429
95% KM (BCA) UCL	0.434
95% KM (Percentile Bootstrap) UCL	0.432
95% KM (Chebyshev) UCL	0.596
97.5% KM (Chebyshev) UCL	**0.712**
99% KM (Chebyshev) UCL	0.939

Potential UCL to Use _______

Cobalt

Total Number of Data	166
Number of Non-Detect Data	1
Number of Detected Data	**165**
Minimum Detected	0.049

Maximum Detected	16
Percent Non-Detects	**0.60%**
Minimum Non-detect	0.025
Maximum Non-detect	0.025

Mean of Detected Data	4.169
Median of Detected Data	3.99
Variance of Detected Data	4.113
SD of Detected Data	2.028
CV of Detected Data	0.486
Skewness of Detected Data	1.409
Mean of Detected log data	1.289
SD of Detected Log data	0.615

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	0.615
Mean	4.109
SD	1.885
95% Winsor (t) UCL	**4.351**

Kaplan Meier (KM) Method	
Mean	4.144
SD	2.041
Standard Error of Mean	0.159
95% KM (t) UCL	4.407
95% KM (z) UCL	4.406
95% KM (BCA) UCL	4.408
95% KM (Percentile Bootstrap) UCL	4.417
95% KM (Chebyshev) UCL	4.837
97.5% KM (Chebyshev) UCL	5.137
99% KM (Chebyshev) UCL	5.725

Data appear Normal (0.05)

May want to try Normal UCLs

Copper

Total Number of Data	166
Number of Non-Detect Data	2
Number of Detected Data	**164**
Minimum Detected	0.13
Maximum Detected	487
Percent Non-Detects	**1.20%**
Minimum Non-detect	0.066
Maximum Non-detect	0.3

Mean of Detected Data	24.55
Median of Detected Data	12
Variance of Detected Data	2206
SD of Detected Data	46.97
CV of Detected Data	1.913
Skewness of Detected Data	6.882

Mean of Detected log data	2.587
SD of Detected Log data	1.065

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	3
Number treated as Detected	163
Single DL Percent Detection	1.81%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	1.81%
Mean	21.1
SD	25.47
95% Winsor (t) UCL	24.37

Kaplan Meier (KM) Method	
Mean	24.26
SD	46.62
Standard Error of Mean	3.63
95% KM (t) UCL	30.26
95% KM (z) UCL	30.23
95% KM (BCA) UCL	31.03
95% KM (Percentile Bootstrap) UCL	30.9
95% KM (Chebyshev) UCL	40.08
97.5% KM (Chebyshev) UCL	46.92
99% KM (Chebyshev) UCL	60.37

Potential UCL to Use	
95% KM (Chebyshev) UCL	**40.08**

Cyclohexane

Total Number of Data	83
Number of Non-Detect Data	36
Number of Detected Data	**47**
Minimum Detected	6.26E-04
Maximum Detected	21.7
Percent Non-Detects	**43.37%**
Minimum Non-detect	8.87E-04
Maximum Non-detect	0.0685

Mean of Detected Data	0.467
Median of Detected Data	0.00177
Variance of Detected Data	10.01
SD of Detected Data	3.165
CV of Detected Data	6.783
Skewness of Detected Data	6.855
Mean of Detected log data	-5.92
SD of Detected Log data	1.616

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	81
Number treated as Detected	2
Single DL Percent Detection	97.59%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.265
SD	2.367
Standard Error of Mean	0.263
95% KM (t) UCL	0.702
95% KM (z) UCL	0.697
95% KM (BCA) UCL	0.787
95% KM (Percentile Bootstrap) UCL	0.787
95% KM (Chebyshev) UCL	1.409
97.5% KM (Chebyshev) UCL	**1.905**
99% KM (Chebyshev) UCL	2.878

Potential UCL to Use ______

Dibenz(a,h)anthracene

Total Number of Data	166
Number of Non-Detect Data	**110**
Number of Detected Data	56
Minimum Detected	0.0619
Maximum Detected	1.64
Percent Non-Detects	**66.27%**
Minimum Non-detect	0.00846
Maximum Non-detect	0.183

Mean of Detected Data	0.317
Median of Detected Data	0.145
Variance of Detected Data	0.127
SD of Detected Data	0.356
CV of Detected Data	1.122
Skewness of Detected Data	2.024
Mean of Detected log data	-1.608
SD of Detected Log data	0.914

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	143
Number treated as Detected	23
Single DL Percent Detection	86.14%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.148
SD	0.238
Standard Error of Mean	0.0186
95% KM (t) UCL	0.179
95% KM (z) UCL	0.179
95% KM (BCA) UCL	0.186
95% KM (Percentile Bootstrap) UCL	0.18
95% KM (Chebyshev) UCL	0.229
97.5% KM (Chebyshev) UCL	0.264
99% KM (Chebyshev) UCL	0.333
Potential UCL to Use	
95% KM (t) UCL	**0.179**
95% KM (% Bootstrap) UCL	**0.18**

Dibenzofuran

Total Number of Data	166
Number of Non-Detect Data	143
Number of Detected Data	**23**
Minimum Detected	0.0167
Maximum Detected	0.821
Percent Non-Detects	**86.14%**
Minimum Non-detect	0.0124
Maximum Non-detect	0.268
Mean of Detected Data	0.133
Median of Detected Data	0.0604
Variance of Detected Data	0.0357
SD of Detected Data	0.189
CV of Detected Data	1.415
Skewness of Detected Data	2.831
Mean of Detected log data	-2.559
SD of Detected Log data	0.963

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	163
Number treated as Detected	3
Single DL Percent Detection	98.19%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0334
SD	0.0798
Standard Error of Mean	0.00635
95% KM (t) UCL	0.0439
95% KM (z) UCL	0.0439

95% KM (BCA) UCL	0.0541
95% KM (Percentile Bootstrap) UCL	0.05
95% KM (Chebyshev) UCL	0.0611
97.5% KM (Chebyshev) UCL	**0.0731**
99% KM (Chebyshev) UCL	0.0966

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

Dieldrin

Total Number of Data	166
Number of Non-Detect Data	133
Number of Detected Data	**33**
Minimum Detected	2.43E-04
Maximum Detected	0.0205
Percent Non-Detects	**80.12%**
Minimum Non-detect	1.40E-04
Maximum Non-detect	0.0161

Mean of Detected Data	0.00344
Median of Detected Data	0.00172
Variance of Detected Data	2.32E-05
SD of Detected Data	0.00481
CV of Detected Data	1.398
Skewness of Detected Data	2.321
Mean of Detected log data	-6.408
SD of Detected Log data	1.218

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	164
Number treated as Detected	2
Single DL Percent Detection	98.80%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	8.89E-04
SD	0.00247
Standard Error of Mean	1.95E-04
95% KM (t) UCL	0.00121
95% KM (z) UCL	0.00121
95% KM (BCA) UCL	0.00137
95% KM (Percentile Bootstrap) UCL	0.00125
95% KM (Chebyshev) UCL	0.00174
97.5% KM (Chebyshev) UCL	**0.00211**
99% KM (Chebyshev) UCL	0.00283

Data follow Appr. Gamma Distribution (0.05)

May want to try Gamma UCLs

Di-n-butyl phthalate

Total Number of Data	166
Number of Non-Detect Data	155
Number of Detected Data	**11**
Minimum Detected	0.0311
Maximum Detected	0.753
Percent Non-Detects	**93.37%**
Minimum Non-detect	0.0251
Maximum Non-detect	0.542

Mean of Detected Data	0.188
Median of Detected Data	0.0819
Variance of Detected Data	0.0511
SD of Detected Data	0.226
CV of Detected Data	1.201
Skewness of Detected Data	1.85
Mean of Detected log data	-2.241
SD of Detected Log data	1.087

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	165
Number treated as Detected	1
Single DL Percent Detection	99.40%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.0418
SD	0.068
Standard Error of Mean	0.00556
95% KM (t) UCL	0.051
95% KM (z) UCL	0.0509
95% KM (BCA) UCL	0.0679
95% KM (Percentile Bootstrap) UCL	0.0598
95% KM (Chebyshev) UCL	0.066
97.5% KM (Chebyshev) UCL	**0.0765**
99% KM (Chebyshev) UCL	0.097

Data follow Appr. Gamma Distribution (0.05)

May want to try Gamma UCLs

Endosulfan sulfate

Total Number of Data	166

Number of Non-Detect Data	145
Number of Detected Data	**21**
Minimum Detected	4.22E-04
Maximum Detected	0.0713
Percent Non-Detects	**87.35%**
Minimum Non-detect	2.65E-04
Maximum Non-detect	0.0304
Mean of Detected Data	0.00705
Median of Detected Data	0.00154
Variance of Detected Data	2.55E-04
SD of Detected Data	0.016
CV of Detected Data	2.263
Skewness of Detected Data	3.667
Mean of Detected log data	-6.164
SD of Detected Log data	1.391

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	165
Number treated as Detected	1
Single DL Percent Detection	99.40%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00127
SD	0.00597
Standard Error of Mean	4.75E-04
95% KM (t) UCL	0.00206
95% KM (z) UCL	0.00205
95% KM (BCA) UCL	0.0023
95% KM (Percentile Bootstrap) UCL	0.00215
95% KM (Chebyshev) UCL	0.00334
97.5% KM (Chebyshev) UCL	0.00424
99% KM (Chebyshev) UCL	0.006

Potential UCL to Use

95% KM (BCA) UCL	**0.0023**

Endrin aldehyde

Total Number of Data	166
Number of Non-Detect Data	135
Number of Detected Data	**31**
Minimum Detected	4.97E-04
Maximum Detected	0.0738
Percent Non-Detects	**81.33%**
Minimum Non-detect	3.36E-04
Maximum Non-detect	0.0385

Mean of Detected Data	0.00852
Median of Detected Data	0.00247
Variance of Detected Data	2.29E-04
SD of Detected Data	0.0151
CV of Detected Data	1.779
Skewness of Detected Data	3.24
Mean of Detected log data	-5.658
SD of Detected Log data	1.245

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	164
Number treated as Detected	2
Single DL Percent Detection	98.80%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00201
SD	0.00716
Standard Error of Mean	5.66E-04
95% KM (t) UCL	0.00295
95% KM (z) UCL	0.00294
95% KM (BCA) UCL	0.00354
95% KM (Percentile Bootstrap) UCL	0.0032
95% KM (Chebyshev) UCL	0.00448
97.5% KM (Chebyshev) UCL	0.00554
99% KM (Chebyshev) UCL	0.00764

Potential UCL to Use

95% KM (BCA) UCL	**0.00354**

Endrin ketone

Total Number of Data	166
Number of Non-Detect Data	142
Number of Detected Data	**24**
Minimum Detected	7.03E-04
Maximum Detected	0.02
Percent Non-Detects	**85.54%**
Minimum Non-detect	4.26E-04
Maximum Non-detect	0.0482

Mean of Detected Data	0.00502
Median of Detected Data	0.00291
Variance of Detected Data	2.23E-05
SD of Detected Data	0.00473
CV of Detected Data	0.942
Skewness of Detected Data	1.696
Mean of Detected log data	-5.673
SD of Detected Log data	0.886

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	166
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00135
SD	0.00235
Standard Error of Mean	1.88E-04
95% KM (t) UCL	0.00166
95% KM (z) UCL	0.00166
95% KM (BCA) UCL	0.00212
95% KM (Percentile Bootstrap) UCL	0.00201
95% KM (Chebyshev) UCL	0.00217
97.5% KM (Chebyshev) UCL	**0.00253**
99% KM (Chebyshev) UCL	0.00322

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Ethylbenzene

Total Number of Data	83
Number of Non-Detect Data	36
Number of Detected Data	**47**
Minimum Detected	6.54E-04
Maximum Detected	0.105
Percent Non-Detects	**43.37%**
Minimum Non-detect	1.54E-04
Maximum Non-detect	0.0795

Mean of Detected Data	0.00536
Median of Detected Data	0.00206
Variance of Detected Data	2.57E-04
SD of Detected Data	0.016
CV of Detected Data	2.992
Skewness of Detected Data	5.73
Mean of Detected log data	-6.04
SD of Detected Log data	0.853

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	82
Number treated as Detected	1
Single DL Percent Detection	98.80%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0034
SD	0.0122
Standard Error of Mean	0.00135
95% KM (t) UCL	0.00564
95% KM (z) UCL	0.00562
95% KM (BCA) UCL	0.00624
95% KM (Percentile Bootstrap) UCL	0.00591
95% KM (Chebyshev) UCL	0.00929
97.5% KM (Chebyshev) UCL	0.0118
99% KM (Chebyshev) UCL	0.0168
Potential UCL to Use	
95% KM (t) UCL	**0.00564**
95% KM (% Bootstrap) UCL	**0.00591**

Fluoranthene

Total Number of Data	166
Number of Non-Detect Data	70
Number of Detected Data	**96**
Minimum Detected	0.0133
Maximum Detected	14.2
Percent Non-Detects	**42.17%**
Minimum Non-detect	0.0107
Maximum Non-detect	0.213
Mean of Detected Data	1.017
Median of Detected Data	0.179
Variance of Detected Data	4.437
SD of Detected Data	2.106
CV of Detected Data	2.071
Skewness of Detected Data	3.808
Mean of Detected log data	-1.503
SD of Detected Log data	1.799

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	119
Number treated as Detected	47
Single DL Percent Detection	71.69%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.595
SD	1.669
Standard Error of Mean	0.13
95% KM (t) UCL	0.81
95% KM (z) UCL	0.809
95% KM (BCA) UCL	0.825
95% KM (Percentile Bootstrap) UCL	0.819
95% KM (Chebyshev) UCL	1.162
97.5% KM (Chebyshev) UCL	**1.408**
99% KM (Chebyshev) UCL	1.89

Potential UCL to Use ______

Fluorene

Total Number of Data	166
Number of Non-Detect Data	125
Number of Detected Data	**41**
Minimum Detected	0.00945
Maximum Detected	1.11
Percent Non-Detects	**75.30%**
Minimum Non-detect	0.0086
Maximum Non-detect	0.186

Mean of Detected Data	0.149
Median of Detected Data	0.0805
Variance of Detected Data	0.053
SD of Detected Data	0.23
CV of Detected Data	1.543
Skewness of Detected Data	2.813
Mean of Detected log data	-2.681
SD of Detected Log data	1.232

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	158
Number treated as Detected	8
Single DL Percent Detection	95.18%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0444
SD	0.128
Standard Error of Mean	0.0101
95% KM (t) UCL	0.0611
95% KM (z) UCL	0.061
95% KM (BCA) UCL	0.0666
95% KM (Percentile Bootstrap) UCL	0.0624
95% KM (Chebyshev) UCL	0.0883
97.5% KM (Chebyshev) UCL	**0.107**

99% KM (Chebyshev) UCL	0.145

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

gamma-Chlordane

Total Number of Data	166
Number of Non-Detect Data	154
Number of Detected Data	**12**
Minimum Detected	7.10E-04
Maximum Detected	0.0156
Percent Non-Detects	**92.77%**
Minimum Non-detect	2.20E-04
Maximum Non-detect	0.0253

Mean of Detected Data	0.00463
Median of Detected Data	0.00344
Variance of Detected Data	2.56E-05
SD of Detected Data	0.00506
CV of Detected Data	1.093
Skewness of Detected Data	1.624
Mean of Detected log data	-5.882
SD of Detected Log data	1.058

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	166
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	9.98E-04
SD	0.00166
Standard Error of Mean	1.35E-04
95% KM (t) UCL	0.00122
95% KM (z) UCL	0.00122
95% KM (BCA) UCL	0.00173
95% KM (Percentile Bootstrap) UCL	0.00144
95% KM (Chebyshev) UCL	0.00159
97.5% KM (Chebyshev) UCL	**0.00184**
99% KM (Chebyshev) UCL	0.00234

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Indeno(1,2,3-cd)pyrene

Total Number of Data	166
Number of Non-Detect Data	62
Number of Detected Data	**104**
Minimum Detected	0.0574
Maximum Detected	6.49
Percent Non-Detects	**37.35%**
Minimum Non-detect	0.0142
Maximum Non-detect	0.158

Mean of Detected Data	0.58
Median of Detected Data	0.145
Variance of Detected Data	0.934
SD of Detected Data	0.967
CV of Detected Data	1.665
Skewness of Detected Data	3.417
Mean of Detected log data	-1.406
SD of Detected Log data	1.225

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	115
Number treated as Detected	51
Single DL Percent Detection	69.28%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.385
SD	0.802
Standard Error of Mean	0.0626
95% KM (t) UCL	0.489
95% KM (z) UCL	0.488
95% KM (BCA) UCL	0.495
95% KM (Percentile Bootstrap) UCL	0.495
95% KM (Chebyshev) UCL	0.658
97.5% KM (Chebyshev) UCL	0.776
99% KM (Chebyshev) UCL	1.008

Potential UCL to Use
95% KM (Chebyshev) UCL **0.658**

Iron

Number of Valid Observations	166
Number of Distinct Observations	125
Minimum	2410
Maximum	77100
Mean	14277
Median	12400

SD	9389
Variance	88155411
Coefficient of Variation	0.658
Skewness	3.268
Mean of log data	9.418
SD of log data	0.533

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	15482
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	15673
95% Modified-t UCL	15513
Non-Parametric UCLs	
95% CLT UCL	15475
95% Jackknife UCL	15482
95% Standard Bootstrap UCL	15450
95% Bootstrap-t UCL	15739
95% Hall's Bootstrap UCL	15921
95% Percentile Bootstrap UCL	15429
95% BCA Bootstrap UCL	15603
95% Chebyshev(Mean, Sd) UCL	17453
97.5% Chebyshev(Mean, Sd) UCL	18828
99% Chebyshev(Mean, Sd) UCL	21528
Potential UCL to Use	
Use 95% Chebyshev (Mean, Sd) UCL	**17453**

Isopropylbenzene (Cumene)

Total Number of Data	83
Number of Non-Detect Data	67
Number of Detected Data	**16**
Minimum Detected	3.18E-04
Maximum Detected	64.9
Percent Non-Detects	**80.72%**
Minimum Non-detect	7.00E-05
Maximum Non-detect	0.00948
Mean of Detected Data	4.309
Median of Detected Data	0.00233
Variance of Detected Data	262
SD of Detected Data	16.18
CV of Detected Data	3.756
Skewness of Detected Data	3.978
Mean of Detected log data	-4.744
SD of Detected Log data	3.489

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	77

Number treated as Detected	6
Single DL Percent Detection	92.77%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.831
SD	7.087
Standard Error of Mean	0.803
95% KM (t) UCL	2.167
95% KM (z) UCL	2.152
95% KM (BCA) UCL	2.394
95% KM (Percentile Bootstrap) UCL	2.394
95% KM (Chebyshev) UCL	4.333
97.5% KM (Chebyshev) UCL	5.848
99% KM (Chebyshev) UCL	8.825

Potential UCL to Use
97.5% KM (Chebyshev) UCL **5.848**

Lead

Number of Valid Observations	166
Number of Distinct Observations	145
Minimum	2.48
Maximum	702
Mean	53.52
Median	17.1
SD	104.2
Variance	10860
Coefficient of Variation	1.947
Skewness	4.276
Mean of log data	3.186
SD of log data	1.12

Data do not follow a Discernable Distribution

95% Useful UCLs

Student's-t UCL	66.9

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	69.69
95% Modified-t UCL	67.35

Non-Parametric UCLs

95% CLT UCL	66.82
95% Jackknife UCL	66.9
95% Standard Bootstrap UCL	66.77
95% Bootstrap-t UCL	70.85
95% Hall's Bootstrap UCL	69.86
95% Percentile Bootstrap UCL	67.01
95% BCA Bootstrap UCL	68.96

95% Chebyshev(Mean, Sd) UCL	88.78
97.5% Chebyshev(Mean, Sd) UCL	104
99% Chebyshev(Mean, Sd) UCL	134

Potential UCL to Use	
Use 97.5% Chebyshev (Mean, Sd) UCL	**104**

Lithium

Number of Valid Observations	166
Number of Distinct Observations	145
Minimum	0.65
Maximum	28.6
Mean	10.03
Median	9.02
SD	6.299
Variance	39.67
Coefficient of Variation	0.628
Skewness	0.63
Mean of log data	2.054
SD of log data	0.791

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	10.84
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	10.86
95% Modified-t UCL	10.85
Non-Parametric UCLs	
95% CLT UCL	10.84
95% Jackknife UCL	10.84
95% Standard Bootstrap UCL	10.85
95% Bootstrap-t UCL	10.85
95% Hall's Bootstrap UCL	10.89
95% Percentile Bootstrap UCL	10.84
95% BCA Bootstrap UCL	10.86
95% Chebyshev(Mean, Sd) UCL	12.17
97.5% Chebyshev(Mean, Sd) UCL	13.09
99% Chebyshev(Mean, Sd) UCL	14.9

Potential UCL to Use	
Use 95% Chebyshev (Mean, Sd) UCL	**12.17**

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m,p-Xylene

Total Number of Data	83
Number of Non-Detect Data	30
Number of Detected Data	**53**
Minimum Detected	5.58E-04
Maximum Detected	2.56
Percent Non-Detects	**36.14%**

Minimum Non-detect	1.82E-04
Maximum Non-detect	0.0247
Mean of Detected Data	0.0533
Median of Detected Data	0.00141
Variance of Detected Data	0.123
SD of Detected Data	0.351
CV of Detected Data	6.594
Skewness of Detected Data	7.251
Mean of Detected log data	-6.235
SD of Detected Log data	1.391

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	80
Number treated as Detected	3
Single DL Percent Detection	96.39%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0343
SD	0.279
Standard Error of Mean	0.031
95% KM (t) UCL	0.0858
95% KM (z) UCL	0.0852
95% KM (BCA) UCL	0.0945
95% KM (Percentile Bootstrap) UCL	0.0955
95% KM (Chebyshev) UCL	0.169
97.5% KM (Chebyshev) UCL	0.228
99% KM (Chebyshev) UCL	0.342

Potential UCL to Use
95% KM (Chebyshev) UCL **0.169**

Manganese

Number of Valid Observations	166
Number of Distinct Observations	133
Minimum	59.3
Maximum	892
Mean	261.2
Median	224.5
SD	127.4
Variance	16239
Coefficient of Variation	0.488
Skewness	2.072
Mean of log data	5.47
SD of log data	0.429

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	277.5
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	279.2
95% Modified-t UCL	277.8
Non-Parametric UCLs	
95% CLT UCL	277.5
95% Jackknife UCL	277.5
95% Standard Bootstrap UCL	277.4
95% Bootstrap-t UCL	279.2
95% Hall's Bootstrap UCL	280.3
95% Percentile Bootstrap UCL	277.8
95% BCA Bootstrap UCL	279.9
95% Chebyshev(Mean, Sd) UCL	304.3
97.5% Chebyshev(Mean, Sd) UCL	323
99% Chebyshev(Mean, Sd) UCL	359.6
Potential UCL to Use	
Use 95% Student's-t UCL	**277.5**
Or 95% Modified-t UCL	**277.8**

Mercury

Total Number of Data	166
Number of Non-Detect Data	93
Number of Detected Data	**73**
Minimum Detected	0.0026
Maximum Detected	0.85
Percent Non-Detects	**56.02%**
Minimum Non-detect	0.002
Maximum Non-detect	0.048
Mean of Detected Data	0.0533
Median of Detected Data	0.012
Variance of Detected Data	0.0189
SD of Detected Data	0.138
CV of Detected Data	2.582
Skewness of Detected Data	4.518
Mean of Detected log data	-4.069
SD of Detected Log data	1.269

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	154
Number treated as Detected	12
Single DL Percent Detection	92.77%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0256
Standard Error of Mean	0.00734
95% KM (t) UCL	0.0377
95% KM (z) UCL	0.0376
95% KM (BCA) UCL	0.04
95% KM (Percentile Bootstrap) UCL	0.0388
95% KM (Chebyshev) UCL	0.0576
97.5% KM (Chebyshev) UCL	0.0714
99% KM (Chebyshev) UCL	0.0986

Potential UCL to Use	
95% KM (BCA) UCL	**0.04**

Methylcyclohexane

Total Number of Data	83
Number of Non-Detect Data	26
Number of Detected Data	**57**
Minimum Detected	6.65E-04
Maximum Detected	2.73
Percent Non-Detects	**31.33%**
Minimum Non-detect	2.75E-04
Maximum Non-detect	0.0229
Mean of Detected Data	0.0528
Median of Detected Data	0.00224
Variance of Detected Data	0.13
SD of Detected Data	0.361
CV of Detected Data	6.838
Skewness of Detected Data	7.532
Mean of Detected log data	-5.932
SD of Detected Log data	1.234

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	80
Number treated as Detected	3
Single DL Percent Detection	96.39%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0366
SD	0.298
Standard Error of Mean	0.033
95% KM (t) UCL	0.0914
95% KM (z) UCL	0.0908
95% KM (BCA) UCL	0.102
95% KM (Percentile Bootstrap) UCL	0.102

95% KM (Chebyshev) UCL	0.18
97.5% KM (Chebyshev) UCL	0.242
99% KM (Chebyshev) UCL	0.365

Potential UCL to Use	
95% KM (Chebyshev) UCL	**0.18**

Molybdenum

Total Number of Data	166
Number of Non-Detect Data	48
Number of Detected Data	**118**
Minimum Detected	0.088
Maximum Detected	10.4
Percent Non-Detects	**28.92%**
Minimum Non-detect	0.068
Maximum Non-detect	0.33
Mean of Detected Data	1.236
Median of Detected Data	0.615
Variance of Detected Data	2.704
SD of Detected Data	1.644
CV of Detected Data	1.33
Skewness of Detected Data	2.955
Mean of Detected log data	-0.402
SD of Detected Log data	1.095

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	84
Number treated as Detected	82
Single DL Percent Detection	50.60%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.905
SD	1.475
Standard Error of Mean	0.115
95% KM (t) UCL	1.095
95% KM (z) UCL	1.094
95% KM (BCA) UCL	1.099
95% KM (Percentile Bootstrap) UCL	1.101
95% KM (Chebyshev) UCL	1.406
97.5% KM (Chebyshev) UCL	**1.623**
99% KM (Chebyshev) UCL	2.049

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

Naphthalene

Total Number of Data	83
Number of Non-Detect Data	76
Number of Detected Data	**7**
Minimum Detected	0.00482
Maximum Detected	19.2
Percent Non-Detects	**91.57%**
Minimum Non-detect	2.72E-04
Maximum Non-detect	0.0233
Mean of Detected Data	3.817
Median of Detected Data	0.0762
Variance of Detected Data	53.3
SD of Detected Data	7.301
CV of Detected Data	1.913
Skewness of Detected Data	2.047
Mean of Detected log data	-2.014
SD of Detected Log data	3.291

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	79
Number treated as Detected	4
Single DL Percent Detection	95.18%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.326
SD	2.231
Standard Error of Mean	0.264
95% KM (t) UCL	0.766
95% KM (z) UCL	0.761
95% KM (BCA) UCL	0.888
95% KM (Percentile Bootstrap) UCL	0.792
95% KM (Chebyshev) UCL	1.479
97.5% KM (Chebyshev) UCL	1.978
99% KM (Chebyshev) UCL	2.958

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median =**	**<0.00265**
[per recommendation in ProUCL User Guide]	

Nickel

Number of Valid Observations	166
Number of Distinct Observations	120
Minimum	2.7
Maximum	36.7
Mean	11.74
Median	11.65
SD	4.874
Variance	23.76
Coefficient of Variation	0.415
Skewness	1.176
Mean of log data	2.374
SD of log data	0.441

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	12.37
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	12.4
95% Modified-t UCL	12.37
Non-Parametric UCLs	
95% CLT UCL	12.36
95% Jackknife UCL	12.37
95% Standard Bootstrap UCL	12.38
95% Bootstrap-t UCL	12.43
95% Hall's Bootstrap UCL	12.45
95% Percentile Bootstrap UCL	12.39
95% BCA Bootstrap UCL	12.35
95% Chebyshev(Mean, Sd) UCL	13.39
97.5% Chebyshev(Mean, Sd) UCL	14.1
99% Chebyshev(Mean, Sd) UCL	15.5

Potential UCL to Use	
Use 95% Student's-t UCL	**12.37**
Or 95% Modified-t UCL	**12.37**

n-Propylbenzene

Total Number of Data	83
Number of Non-Detect Data	69
Number of Detected Data	**14**
Minimum Detected	2.30E-04
Maximum Detected	1.8
Percent Non-Detects	**83.13%**
Minimum Non-detect	6.40E-05
Maximum Non-detect	0.00868

Mean of Detected Data	0.139
Median of Detected Data	4.49E-04
Variance of Detected Data	0.229
SD of Detected Data	0.479
CV of Detected Data	3.441
Skewness of Detected Data	3.718
Mean of Detected log data	-6.488
SD of Detected Log data	2.756

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	80
Number treated as Detected	3
Single DL Percent Detection	96.39%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0237
SD	0.197
Standard Error of Mean	0.0224
95% KM (t) UCL	0.0609
95% KM (z) UCL	0.0605
95% KM (BCA) UCL	0.0684
95% KM (Percentile Bootstrap) UCL	0.0671
95% KM (Chebyshev) UCL	0.121
97.5% KM (Chebyshev) UCL	0.163
99% KM (Chebyshev) UCL	0.246

Potential UCL to Use
97.5% KM (Chebyshev) UCL 0.163

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o-Xylene

Total Number of Data	83
Number of Non-Detect Data	51
Number of Detected Data	**32**
Minimum Detected	2.23E-04
Maximum Detected	0.84
Percent Non-Detects	**61.45%**
Minimum Non-detect	8.00E-05
Maximum Non-detect	0.0108

Mean of Detected Data	0.0334
Median of Detected Data	6.15E-04
Variance of Detected Data	0.0222
SD of Detected Data	0.149
CV of Detected Data	4.456
Skewness of Detected Data	5.45
Mean of Detected log data	-6.683
SD of Detected Log data	1.929

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	79
Number treated as Detected	4
Single DL Percent Detection	95.18%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.013
SD	0.0925
Standard Error of Mean	0.0103
95% KM (t) UCL	0.0302
95% KM (z) UCL	0.03
95% KM (BCA) UCL	0.0338
95% KM (Percentile Bootstrap) UCL	0.0322
95% KM (Chebyshev) UCL	0.058
97.5% KM (Chebyshev) UCL	**0.0775**
99% KM (Chebyshev) UCL	0.116

Potential UCL to Use ______

Phenanthrene

Total Number of Data	166
Number of Non-Detect Data	71
Number of Detected Data	**95**
Minimum Detected	0.0138
Maximum Detected	12.6
Percent Non-Detects	**42.77%**
Minimum Non-detect	0.0115
Maximum Non-detect	0.235

Mean of Detected Data	0.691
Median of Detected Data	0.142
Variance of Detected Data	2.449
SD of Detected Data	1.565
CV of Detected Data	2.264
Skewness of Detected Data	5.422
Mean of Detected log data	-1.663
SD of Detected Log data	1.597

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	129
Number treated as Detected	37
Single DL Percent Detection	77.71%

Data Dsitribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.402
SD	1.224
Standard Error of Mean	0.0955
95% KM (t) UCL	0.56
95% KM (z) UCL	0.559
95% KM (BCA) UCL	0.593
95% KM (Percentile Bootstrap) UCL	0.572
95% KM (Chebyshev) UCL	0.819
97.5% KM (Chebyshev) UCL	**0.999**
99% KM (Chebyshev) UCL	1.353

Potential UCL to Use _______

Pyrene

Total Number of Data	166
Number of Non-Detect Data	68
Number of Detected Data	**98**
Minimum Detected	0.0121
Maximum Detected	8.47
Percent Non-Detects	**40.96%**
Minimum Non-detect	0.0111
Maximum Non-detect	0.3

Mean of Detected Data	0.721
Median of Detected Data	0.164
Variance of Detected Data	1.891
SD of Detected Data	1.375
CV of Detected Data	1.908
Skewness of Detected Data	3.327
Mean of Detected log data	-1.67
SD of Detected Log data	1.681

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	131
Number treated as Detected	35
Single DL Percent Detection	78.92%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.432
SD	1.107
Standard Error of Mean	0.0864
95% KM (t) UCL	0.575

95% KM (z) UCL	0.574
95% KM (BCA) UCL	0.58
95% KM (Percentile Bootstrap) UCL	0.572
95% KM (Chebyshev) UCL	0.808
97.5% KM (Chebyshev) UCL	**0.971**
99% KM (Chebyshev) UCL	1.291

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Strontium

Number of Valid Observations	166
Number of Distinct Observations	151
Minimum	16.5
Maximum	591
Mean	75.61
Median	58.1
SD	73.75
Variance	5439
Coefficient of Variation	0.975
Skewness	4.41
Mean of log data	4.107
SD of log data	0.59

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	85.08
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	87.12
95% Modified-t UCL	85.41
Non-Parametric UCLs	
95% CLT UCL	85.03
95% Jackknife UCL	85.08
95% Standard Bootstrap UCL	85.02
95% Bootstrap-t UCL	87.86
95% Hall's Bootstrap UCL	88.32
95% Percentile Bootstrap UCL	85.49
95% BCA Bootstrap UCL	86.55
95% Chebyshev(Mean, Sd) UCL	100.6
97.5% Chebyshev(Mean, Sd) UCL	111.4
99% Chebyshev(Mean, Sd) UCL	132.6
Potential UCL to Use	
Use 95% Chebyshev (Mean, Sd) UCL	**100.6**

Tin

Total Number of Data	166
Number of Non-Detect Data	134
Number of Detected Data	**32**

Minimum Detected	0.55
Maximum Detected	6.48
Percent Non-Detects	**80.72%**
Minimum Non-detect	0.46
Maximum Non-detect	2.4
Mean of Detected Data	1.896
Median of Detected Data	1.695
Variance of Detected Data	1.825
SD of Detected Data	1.351
CV of Detected Data	0.713
Skewness of Detected Data	1.594
Mean of Detected log data	0.413
SD of Detected Log data	0.692

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	156
Number treated as Detected	10
Single DL Percent Detection	93.98%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.811
SD	0.789
Standard Error of Mean	0.0623
95% KM (t) UCL	0.914
95% KM (z) UCL	0.914
95% KM (BCA) UCL	0.929
95% KM (Percentile Bootstrap) UCL	0.924
95% KM (Chebyshev) UCL	1.083
97.5% KM (Chebyshev) UCL	**1.2**
99% KM (Chebyshev) UCL	1.431

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Titanium

Number of Valid Observations	166
Number of Distinct Observations	114
Minimum	4.02
Maximum	645
Mean	25.77
Median	19
SD	50.15
Variance	2515
Coefficient of Variation	1.946
Skewness	11.61

Mean of log data	3.014
SD of log data	0.484

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	32.21
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	35.92
95% Modified-t UCL	32.8
Non-Parametric UCLs	
95% CLT UCL	32.17
95% Jackknife UCL	32.21
95% Standard Bootstrap UCL	32.16
95% Bootstrap-t UCL	49.28
95% Hall's Bootstrap UCL	55.9
95% Percentile Bootstrap UCL	33.18
95% BCA Bootstrap UCL	38.2
95% Chebyshev(Mean, Sd) UCL	42.74
97.5% Chebyshev(Mean, Sd) UCL	50.08
99% Chebyshev(Mean, Sd) UCL	64.5
Potential UCL to Use	
Use 95% Student's-t UCL	**32.21**
Or 95% Modified-t UCL	**32.8**

Toluene

Total Number of Data	83
Number of Non-Detect Data	14
Number of Detected Data	**69**
Minimum Detected	7.21E-04
Maximum Detected	0.0192
Percent Non-Detects	**16.87%**
Minimum Non-detect	5.22E-04
Maximum Non-detect	0.211
Mean of Detected Data	0.00437
Median of Detected Data	0.00382
Variance of Detected Data	7.80E-06
SD of Detected Data	0.00279
CV of Detected Data	0.639
Skewness of Detected Data	2.436
Mean of Detected log data	-5.612
SD of Detected Log data	0.626

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	83
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00399
SD	0.00285
Standard Error of Mean	3.27E-04
95% KM (t) UCL	0.00454
95% KM (z) UCL	0.00453
95% KM (BCA) UCL	0.00463
95% KM (Percentile Bootstrap) UCL	0.00453
95% KM (Chebyshev) UCL	0.00542
97.5% KM (Chebyshev) UCL	**0.00604**
99% KM (Chebyshev) UCL	0.00725

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Vanadium

Number of Valid Observations	166
Number of Distinct Observations	117
Minimum	4.73
Maximum	45.6
Mean	14.4
Median	13.75
SD	5.905
Variance	34.87
Coefficient of Variation	0.41
Skewness	1.359
Mean of log data	2.588
SD of log data	0.406
95% Useful UCLs	
Student's-t UCL	15.16
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	15.21
95% Modified-t UCL	15.17
Non-Parametric UCLs	
95% CLT UCL	15.16
95% Jackknife UCL	15.16
95% Standard Bootstrap UCL	15.16
95% Bootstrap-t UCL	15.23
95% Hall's Bootstrap UCL	15.21
95% Percentile Bootstrap UCL	15.15
95% BCA Bootstrap UCL	15.21
95% Chebyshev(Mean, Sd) UCL	16.4
97.5% Chebyshev(Mean, Sd) UCL	**17.27**
99% Chebyshev(Mean, Sd) UCL	18.96

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Xylene (total)

Total Number of Data	83
Number of Non-Detect Data	30
Number of Detected Data	**53**
Minimum Detected	7.77E-04
Maximum Detected	3.4
Percent Non-Detects	**36.14%**
Minimum Non-detect	2.61E-04
Maximum Non-detect	0.0355

Mean of Detected Data	0.0735
Median of Detected Data	0.00187
Variance of Detected Data	0.218
SD of Detected Data	0.467
CV of Detected Data	6.356
Skewness of Detected Data	7.213
Mean of Detected log data	-5.976
SD of Detected Log data	1.506

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	79
Number treated as Detected	4
Single DL Percent Detection	95.18%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.0473
SD	0.371
Standard Error of Mean	0.0412
95% KM (t) UCL	0.116
95% KM (z) UCL	0.115
95% KM (BCA) UCL	0.129
95% KM (Percentile Bootstrap) UCL	0.129
95% KM (Chebyshev) UCL	0.227
97.5% KM (Chebyshev) UCL	**0.304**
99% KM (Chebyshev) UCL	0.457

Potential UCL to Use ______

Zinc

Number of Valid Observations	166
Number of Distinct Observations	159

Minimum	6.17
Maximum	7650
Mean	433.8
Median	192.5
SD	786.8
Variance	619126
Coefficient of Variation	1.814
Skewness	5.977
Mean of log data	5.141
SD of log data	1.438

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	534.8
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	564.5
95% Modified-t UCL	539.6
Non-Parametric UCLs	
95% CLT UCL	534.3
95% Jackknife UCL	534.8
95% Standard Bootstrap UCL	534.4
95% Bootstrap-t UCL	604.2
95% Hall's Bootstrap UCL	971.8
95% Percentile Bootstrap UCL	543.4
95% BCA Bootstrap UCL	581.3
95% Chebyshev(Mean, Sd) UCL	700
97.5% Chebyshev(Mean, Sd) UCL	815.2
99% Chebyshev(Mean, Sd) UCL	1041
Potential UCL to Use	
Use 97.5% Chebyshev (Mean, Sd) UCL	**815.2**

APPENDIX A-3

NORTH OF MARLIN SURFACE SOIL

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	C:\Users\Michael\ . . . . \North of Marlin Soil Boring\N of Marlin Soil - surface\North of Marlin Soil - surface_ProUCL input.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,1-Dichloroethane

Total Number of Data 1

Insufficent Number of Observations to produce Meaningful Statistics.

Instead, EPC is single value (nondetect) = <0.00671

1,1-Dichloroethene

Total Number of Data 1

Insufficent Number of Observations to produce Meaningful Statistics.

Instead, EPC is single value (nondetect) = <0.015

1,2-Dichloroethane

Total Number of Data 1

Insufficent Number of Observations to produce Meaningful Statistics.

Instead, EPC is single value (detect) = 0.177

2-Butanone

Total Number of Data 1

Insufficent Number of Observations to produce Meaningful Statistics.

Instead, EPC is single value (nondetect) = <0.013

2-Methylnaphthalene

Total Number of Data	18
Number of Non-Detect Data	15
Number of Detected Data	**3**
Minimum Detected	0.01
Maximum Detected	0.053
Percent Non-Detects	**83.33%**
Minimum Non-detect	0.01
Maximum Non-detect	0.0634
Mean of Detected Data	0.0362

Median of Detected Data	0.0456
Variance of Detected Data	5.29E-04
SD of Detected Data	0.023
CV of Detected Data	0.635
Skewness of Detected Data	-1.532
Mean of Detected log data	-3.543
SD of Detected Log data	0.923

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	18
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0146
SD	0.0127
Standard Error of Mean	0.00378
95% KM (t) UCL	0.0212
95% KM (z) UCL	0.0208
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.053
95% KM (Chebyshev) UCL	0.0311
97.5% KM (Chebyshev) UCL	0.0382
99% KM (Chebyshev) UCL	0.0522

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0118**
[per recommendation in ProUCL User Guide]

4,4'-DDE

Total Number of Data	18
Number of Non-Detect Data	16

Number of Detected Data	**2**
Minimum Detected	0.00216
Maximum Detected	0.0149
Percent Non-Detects	**88.89%**
Minimum Non-detect	3.83E-04
Maximum Non-detect	0.00252
Mean of Detected Data	0.00853
Median of Detected Data	0.00853
Variance of Detected Data	8.12E-05
SD of Detected Data	0.00901
CV of Detected Data	1.056
Skewness of Detected Data	N/A
Mean of Detected log data	-5.172
SD of Detected Log data	1.366

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00287
SD	0.00292
Standard Error of Mean	9.73E-04
95% KM (t) UCL	0.00456
95% KM (z) UCL	0.00447
95% KM (BCA) UCL	0.0149
95% KM (Percentile Bootstrap) UCL	0.0149
95% KM (Chebyshev) UCL	0.00711
97.5% KM (Chebyshev) UCL	0.00894

99% KM (Chebyshev) UCL	0.0125

Potential UCL to Use

95% KM (BCA) UCL	0.0149

**** Instead of UCL, EPC is selected to be median = <0.000424**
[per recommendation in ProUCL User Guide]

4,4'-DDT

Total Number of Data	18
Number of Non-Detect Data	11
Number of Detected Data	**7**
Minimum Detected	0.000597
Maximum Detected	0.0108
Percent Non-Detects	**61.11%**
Minimum Non-detect	1.48E-04
Maximum Non-detect	0.00282
Mean of Detected Data	0.0029
Median of Detected Data	0.00122
Variance of Detected Data	1.38E-05
SD of Detected Data	0.00372
CV of Detected Data	1.282
Skewness of Detected Data	2.085
Mean of Detected log data	-6.377
SD of Detected Log data	1.031

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	16
Number treated as Detected	2
Single DL Percent Detection	88.89%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0015
SD	0.00242
Standard Error of Mean	6.17E-04
95% KM (t) UCL	0.00257
95% KM (z) UCL	0.00252

95% KM (BCA) UCL	0.0031
95% KM (Percentile Bootstrap) UCL	0.00269
95% KM (Chebyshev) UCL	0.00419
97.5% KM (Chebyshev) UCL	0.00535
99% KM (Chebyshev) UCL	0.00764

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

**** Instead of UCL, EPC is selected to be median = <0.000545**
[per recommendation in ProUCL User Guide]

Acenaphthene

Total Number of Data	18
Number of Non-Detect Data	16
Number of Detected Data	**2**
Minimum Detected	0.021
Maximum Detected	0.157
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.01
Maximum Non-detect	0.0583
Mean of Detected Data	0.089
Median of Detected Data	0.089
Variance of Detected Data	0.00925
SD of Detected Data	0.0962
CV of Detected Data	1.081
Skewness of Detected Data	N/A
Mean of Detected log data	-2.857
SD of Detected Log data	1.423

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0286
SD	0.0312
Standard Error of Mean	0.0104
95% KM (t) UCL	0.0466
95% KM (z) UCL	0.0456
95% KM (BCA) UCL	0.157
95% KM (Percentile Bootstrap) UCL	0.157
95% KM (Chebyshev) UCL	0.0738
97.5% KM (Chebyshev) UCL	0.0934
99% KM (Chebyshev) UCL	0.132

**** Instead of UCL, EPC is selected to be median = <0.0110**
[per recommendation in ProUCL User Guide]

Acenaphthylene

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.0555
Maximum Detected	0.0555
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.00768
Maximum Non-detect	0.0661

Data set has all detected values equal to = 0.0555, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0555

**** Instead of UCL, EPC is selected to be median = <0.0121**
[per recommendation in ProUCL User Guide]

Aluminum

Number of Valid Observations	18
Number of Distinct Observations	17
Minimum	1810
Maximum	16800
Mean	10673
Median	10300
SD	3687

Variance	13591176
Coefficient of Variation	0.345
Skewness	-0.368
Mean of log data	9.189
SD of log data	0.496

95% Useful UCLs	
Student's-t UCL	**12185**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	12022
95% Modified-t UCL	12172

Non-Parametric UCLs	
95% CLT UCL	12103
95% Jackknife UCL	12185
95% Standard Bootstrap UCL	12058
95% Bootstrap-t UCL	12081
95% Hall's Bootstrap UCL	12129
95% Percentile Bootstrap UCL	12001
95% BCA Bootstrap UCL	12048
95% Chebyshev(Mean, Sd) UCL	14461
97.5% Chebyshev(Mean, Sd) UCL	16100
99% Chebyshev(Mean, Sd) UCL	19319

Data appear Normal (0.05)
May want to try Normal UCLs

Anthracene

Total Number of Data	18
Number of Non-Detect Data	14
Number of Detected Data	**4**
Minimum Detected	0.00887
Maximum Detected	0.264
Percent Non-Detects	**77.78%**
Minimum Non-detect	0.00744
Maximum Non-detect	0.0641

Mean of Detected Data	0.089
Median of Detected Data	0.0415
Variance of Detected Data	0.0139
SD of Detected Data	0.118
CV of Detected Data	1.326
Skewness of Detected Data	1.872
Mean of Detected log data	-3.119
SD of Detected Log data	1.402

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0269
SD	0.0585
Standard Error of Mean	0.016
95% KM (t) UCL	0.0546
95% KM (z) UCL	0.0531
95% KM (BCA) UCL	0.264
95% KM (Percentile Bootstrap) UCL	0.0836
95% KM (Chebyshev) UCL	0.0964
97.5% KM (Chebyshev) UCL	0.127
99% KM (Chebyshev) UCL	0.186

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0121**
[per recommendation in ProUCL User Guide]

Antimony

Total Number of Data	18
Number of Non-Detect Data	9
Number of Detected Data	**9**
Minimum Detected	1.66
Maximum Detected	8.09
Percent Non-Detects	**50.00%**
Minimum Non-detect	0.19
Maximum Non-detect	0.25

Mean of Detected Data	3.373
Median of Detected Data	2.62
Variance of Detected Data	3.814
SD of Detected Data	1.953
CV of Detected Data	0.579
Skewness of Detected Data	2.131
Mean of Detected log data	1.107
SD of Detected Log data	0.461

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	2.517
SD	1.559
Standard Error of Mean	0.39
95% KM (t) UCL	3.194
95% KM (z) UCL	3.158
95% KM (BCA) UCL	3.612
95% KM (Percentile Bootstrap) UCL	3.351
95% KM (Chebyshev) UCL	4.215
97.5% KM (Chebyshev) UCL	**4.95**
99% KM (Chebyshev) UCL	6.394

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Aroclor-1254

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.0122
Maximum Detected	0.0122
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.00383
Maximum Non-detect	0.031

Data set has all detected values equal to = 0.0122, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0122

**** Instead of UCL, EPC is selected to be median = <0.00429**
[per recommendation in ProUCL User Guide]

Arsenic

Total Number of Data	18
Number of Non-Detect Data	1
Number of Detected Data	**17**
Minimum Detected	0.54
Maximum Detected	5.69
Percent Non-Detects	**5.56%**
Minimum Non-detect	0.68
Maximum Non-detect	0.68
Mean of Detected Data	2.651
Median of Detected Data	2.55
Variance of Detected Data	1.123
SD of Detected Data	1.06
CV of Detected Data	0.4
Skewness of Detected Data	1.143
Mean of Detected log data	0.887
SD of Detected Log data	0.476

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	0.476
Mean	2.526
SD	0.59
95% Winsor (t) UCL	2.772
Kaplan Meier (KM) Method	
Mean	2.533
SD	1.11
Standard Error of Mean	0.27
95% KM (t) UCL	3.002
95% KM (z) UCL	2.977
95% KM (BCA) UCL	3.069
95% KM (Percentile Bootstrap) UCL	3.002
95% KM (Chebyshev) UCL	3.709
97.5% KM (Chebyshev) UCL	**4.218**
99% KM (Chebyshev) UCL	5.217

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Barium

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	46.1
Maximum	476
Mean	145.2
Median	114
SD	115.8

Variance	13417
Coefficient of Variation	0.798
Skewness	2.357
Mean of log data	4.783
SD of log data	0.59

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	192.6
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	206.3
95% Modified-t UCL	195.2
Non-Parametric UCLs	
95% CLT UCL	190.1
95% Jackknife UCL	192.6
95% Standard Bootstrap UCL	189.6
95% Bootstrap-t UCL	287.9
95% Hall's Bootstrap UCL	491.4
95% Percentile Bootstrap UCL	196.4
95% BCA Bootstrap UCL	207.9
95% Chebyshev(Mean, Sd) UCL	264.2
97.5% Chebyshev(Mean, Sd) UCL	315.6
99% Chebyshev(Mean, Sd) UCL	416.8

Potential UCL to Use
Use 95% Chebyshev (Mean, Sd) UCL **264.2**

Benzo(a)anthracene

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	1.18
Maximum Detected	1.18
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.00503
Maximum Non-detect	1.18

Data set has all detected values equal to = 1.18, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 1.18

**** Instead of UCL, EPC is selected to be median =** **<0.0110**
[per recommendation in ProUCL User Guide]

Benzo(a)pyrene

Total Number of Data	18
Number of Non-Detect Data	11
Number of Detected Data	**7**
Minimum Detected	0.0135
Maximum Detected	1.42
Percent Non-Detects	**61.11%**
Minimum Non-detect	0.00901
Maximum Non-detect	0.0117

Mean of Detected Data	0.284
Median of Detected Data	0.103
Variance of Detected Data	0.253
SD of Detected Data	0.503
CV of Detected Data	1.773
Skewness of Detected Data	2.591
Mean of Detected log data	-2.178
SD of Detected Log data	1.387

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.119
SD	0.319
Standard Error of Mean	0.0813
95% KM (t) UCL	0.26
95% KM (z) UCL	0.252
95% KM (BCA) UCL	0.305
95% KM (Percentile Bootstrap) UCL	0.273
95% KM (Chebyshev) UCL	0.473
97.5% KM (Chebyshev) UCL	0.626
99% KM (Chebyshev) UCL	0.927

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0116**
[per recommendation in ProUCL User Guide]

Benzo(b)fluoranthene

Total Number of Data	18
Number of Non-Detect Data	10
Number of Detected Data	**8**
Minimum Detected	0.0487
Maximum Detected	1.62
Percent Non-Detects	**55.56%**
Minimum Non-detect	0.00721
Maximum Non-detect	0.0497
Mean of Detected Data	0.318
Median of Detected Data	0.13
Variance of Detected Data	0.279
SD of Detected Data	0.528
CV of Detected Data	1.659
Skewness of Detected Data	2.777
Mean of Detected log data	-1.785
SD of Detected Log data	1.019

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	11
Number treated as Detected	7
Single DL Percent Detection	61.11%

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.169
SD	0.356
Standard Error of Mean	0.0896
95% KM (t) UCL	0.325
95% KM (z) UCL	0.316
95% KM (BCA) UCL	0.373
95% KM (Percentile Bootstrap) UCL	0.339
95% KM (Chebyshev) UCL	0.559
97.5% KM (Chebyshev) UCL	0.728
99% KM (Chebyshev) UCL	1.06

Potential UCL to Use	
95% KM (BCA) UCL	**0.373**

Benzo(g,h,i)perylene

Total Number of Data	18
Number of Non-Detect Data	8
Number of Detected Data	**10**
Minimum Detected	0.0237
Maximum Detected	1.28
Percent Non-Detects	**44.44%**
Minimum Non-detect	0.0103
Maximum Non-detect	0.0116
Mean of Detected Data	0.234
Median of Detected Data	0.0895
Variance of Detected Data	0.147
SD of Detected Data	0.384
CV of Detected Data	1.642
Skewness of Detected Data	2.721
Mean of Detected log data	-2.257
SD of Detected Log data	1.245

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.14
SD	0.291
Standard Error of Mean	0.0723
95% KM (t) UCL	0.266
95% KM (z) UCL	0.259
95% KM (BCA) UCL	0.288
95% KM (Percentile Bootstrap) UCL	0.277
95% KM (Chebyshev) UCL	0.455
97.5% KM (Chebyshev) UCL	**0.592**
99% KM (Chebyshev) UCL	0.859

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Benzo(k)fluoranthene

Total Number of Data	18
Number of Non-Detect Data	14
Number of Detected Data	**4**
Minimum Detected	0.068

Maximum Detected	0.799
Percent Non-Detects	**77.78%**
Minimum Non-detect	0.011
Maximum Non-detect	0.0916
Mean of Detected Data	0.272
Median of Detected Data	0.111
Variance of Detected Data	0.124
SD of Detected Data	0.353
CV of Detected Data	1.296
Skewness of Detected Data	1.949
Mean of Detected log data	-1.849
SD of Detected Log data	1.13

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	16
Number treated as Detected	2
Single DL Percent Detection	88.89%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.113
SD	0.167
Standard Error of Mean	0.0455
95% KM (t) UCL	0.193
95% KM (z) UCL	0.188
95% KM (BCA) UCL	0.799
95% KM (Percentile Bootstrap) UCL	0.252
95% KM (Chebyshev) UCL	0.312
97.5% KM (Chebyshev) UCL	0.398
99% KM (Chebyshev) UCL	0.566

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median = <0.0175**
[per recommendation in ProUCL User Guide]

Beryllium

Total Number of Data	18
Number of Non-Detect Data	1
Number of Detected Data	**17**
Minimum Detected	0.066
Maximum Detected	2.88
Percent Non-Detects	**5.56%**
Minimum Non-detect	0.026
Maximum Non-detect	0.026
Mean of Detected Data	0.749
Median of Detected Data	0.66
Variance of Detected Data	0.356
SD of Detected Data	0.597
CV of Detected Data	0.797
Skewness of Detected Data	3.046
Mean of Detected log data	-0.528
SD of Detected Log data	0.774

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	0.774
Mean	0.605
SD	0.277
95% Winsor (t) UCL	0.72
Kaplan Meier (KM) Method	
Mean	0.711
SD	0.584
Standard Error of Mean	0.142
95% KM (t) UCL	0.958
95% KM (z) UCL	0.944
95% KM (BCA) UCL	0.995
95% KM (Percentile Bootstrap) UCL	0.959
95% KM (Chebyshev) UCL	1.329
97.5% KM (Chebyshev) UCL	**1.597**
99% KM (Chebyshev) UCL	2.123

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Bis(2-Ethylhexyl)phthalate

Total Number of Data	18
Number of Non-Detect Data	11
Number of Detected Data	**7**
Minimum Detected	0.0122
Maximum Detected	0.239
Percent Non-Detects	**61.11%**
Minimum Non-detect	0.046
Maximum Non-detect	0.105

Mean of Detected Data	0.0693
Median of Detected Data	0.0532
Variance of Detected Data	0.00595
SD of Detected Data	0.0771
CV of Detected Data	1.113
Skewness of Detected Data	2.321
Mean of Detected log data	-3.069
SD of Detected Log data	0.937

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0445
SD	0.0502
Standard Error of Mean	0.0138
95% KM (t) UCL	0.0685
95% KM (z) UCL	0.0672
95% KM (BCA) UCL	0.076
95% KM (Percentile Bootstrap) UCL	0.0695
95% KM (Chebyshev) UCL	0.105
97.5% KM (Chebyshev) UCL	0.131
99% KM (Chebyshev) UCL	0.182

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median = <0.0546**
[per recommendation in ProUCL User Guide]

Boron

Total Number of Data	18
Number of Non-Detect Data	5
Number of Detected Data	**13**
Minimum Detected	3.15

Maximum Detected	39.2
Percent Non-Detects	**27.78%**
Minimum Non-detect	1.11
Maximum Non-detect	1.25

Mean of Detected Data	10.89
Median of Detected Data	9
Variance of Detected Data	95.21
SD of Detected Data	9.757
CV of Detected Data	0.896
Skewness of Detected Data	2.309
Mean of Detected log data	2.125
SD of Detected Log data	0.713

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	0.713
Mean	5.999
SD	2.737
95% Winsor (t) UCL	7.221

Kaplan Meier (KM) Method	
Mean	8.743
SD	8.689
Standard Error of Mean	2.132
95% KM (t) UCL	12.45
95% KM (z) UCL	12.25
95% KM (BCA) UCL	12.91
95% KM (Percentile Bootstrap) UCL	12.43
95% KM (Chebyshev) UCL	18.03
97.5% KM (Chebyshev) UCL	**22.06**
99% KM (Chebyshev) UCL	29.95

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Butyl benzyl phthalate

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.151
Maximum Detected	0.151
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.00913
Maximum Non-detect	0.0733

Data set has all detected values equal to = 0.151, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.151

**** Instead of UCL, EPC is selected to be median = <0.0136**
[per recommendation in ProUCL User Guide]

Cadmium

Total Number of Data	18
Number of Non-Detect Data	10
Number of Detected Data	**8**
Minimum Detected	0.28
Maximum Detected	0.8
Percent Non-Detects	**55.56%**
Minimum Non-detect	0.006
Maximum Non-detect	0.033
Mean of Detected Data	0.455
Median of Detected Data	0.385
Variance of Detected Data	0.028
SD of Detected Data	0.167
CV of Detected Data	0.368
Skewness of Detected Data	1.539
Mean of Detected log data	-0.838
SD of Detected Log data	0.327

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.358
SD	0.136
Standard Error of Mean	0.0342
95% KM (t) UCL	0.417
95% KM (z) UCL	0.414
95% KM (BCA) UCL	0.467
95% KM (Percentile Bootstrap) UCL	0.45

95% KM (Chebyshev) UCL	0.507
97.5% KM (Chebyshev) UCL	**0.572**
99% KM (Chebyshev) UCL	0.698

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Carbazole

Total Number of Data	18
Number of Non-Detect Data	14
Number of Detected Data	**4**
Minimum Detected	0.013
Maximum Detected	0.128
Percent Non-Detects	**77.78%**
Minimum Non-detect	0.00965
Maximum Non-detect	0.0578
Mean of Detected Data	0.0445
Median of Detected Data	0.0185
Variance of Detected Data	0.00311
SD of Detected Data	0.0557
CV of Detected Data	1.252
Skewness of Detected Data	1.987
Mean of Detected log data	-3.595
SD of Detected Log data	1.04

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.02
SD	0.0262
Standard Error of Mean	0.00714
95% KM (t) UCL	0.0325
95% KM (z) UCL	0.0318
95% KM (BCA) UCL	0.128

95% KM (Percentile Bootstrap) UCL	0.0388
95% KM (Chebyshev) UCL	0.0512
97.5% KM (Chebyshev) UCL	0.0647
99% KM (Chebyshev) UCL	0.0911

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0111**
[per recommendation in ProUCL User Guide]

Chromium

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	7.9
Maximum	128
Mean	20.26
Median	11.6
SD	27.58
Variance	760.5
Coefficient of Variation	1.361
Skewness	3.912
Mean of log data	2.683
SD of log data	0.658

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	31.56
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	37.35
95% Modified-t UCL	32.56
Non-Parametric UCLs	
95% CLT UCL	30.95
95% Jackknife UCL	31.56
95% Standard Bootstrap UCL	30.37
95% Bootstrap-t UCL	66.91
95% Hall's Bootstrap UCL	67.88
95% Percentile Bootstrap UCL	32.64
95% BCA Bootstrap UCL	40.53
95% Chebyshev(Mean, Sd) UCL	48.59
97.5% Chebyshev(Mean, Sd) UCL	60.85
99% Chebyshev(Mean, Sd) UCL	84.93

Potential UCL to Use
Use 95% Chebyshev (Mean, Sd) UCL **48.59**

Chrysene

Total Number of Data	18
Number of Non-Detect Data	11
Number of Detected Data	**7**
Minimum Detected	0.011
Maximum Detected	1.3
Percent Non-Detects	**61.11%**
Minimum Non-detect	0.00911
Maximum Non-detect	0.0523
Mean of Detected Data	0.253
Median of Detected Data	0.115
Variance of Detected Data	0.216
SD of Detected Data	0.465
CV of Detected Data	1.838
Skewness of Detected Data	2.58
Mean of Detected log data	-2.455
SD of Detected Log data	1.543

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	13
Number treated as Detected	5
Single DL Percent Detection	72.22%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.105
SD	0.293
Standard Error of Mean	0.0746
95% KM (t) UCL	0.235
95% KM (z) UCL	0.228
95% KM (BCA) UCL	0.323
95% KM (Percentile Bootstrap) UCL	0.248
95% KM (Chebyshev) UCL	0.43
97.5% KM (Chebyshev) UCL	0.571
99% KM (Chebyshev) UCL	0.847

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

** Instead of UCL, EPC is selected to be median =	<0.0103
[per recommendation in ProUCL User Guide]	

Cobalt

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	2.81
Maximum	7.87
Mean	5.789
Median	5.84
SD	1.506
Variance	2.268
Coefficient of Variation	0.26
Skewness	-0.505
Mean of log data	1.718
SD of log data	0.299
95% Useful UCLs	
Student's-t UCL	**6.406**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	6.328
95% Modified-t UCL	6.399
Non-Parametric UCLs	
95% CLT UCL	6.373
95% Jackknife UCL	6.406
95% Standard Bootstrap UCL	6.352
95% Bootstrap-t UCL	6.376
95% Hall's Bootstrap UCL	6.339
95% Percentile Bootstrap UCL	6.363
95% BCA Bootstrap UCL	6.318
95% Chebyshev(Mean, Sd) UCL	7.336
97.5% Chebyshev(Mean, Sd) UCL	8.006
99% Chebyshev(Mean, Sd) UCL	9.321

Data appear Normal (0.05)
May want to try Normal UCLs

Copper

Number of Valid Observations	18
Number of Distinct Observations	17
Minimum	5.9
Maximum	200
Mean	24.13
Median	9.895
SD	44.66
Variance	1994

Coefficient of Variation	1.851
Skewness	4.008
Mean of log data	2.621
SD of log data	0.865

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	42.44
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	52.07
95% Modified-t UCL	44.1
Non-Parametric UCLs	
95% CLT UCL	41.44
95% Jackknife UCL	42.44
95% Standard Bootstrap UCL	40.65
95% Bootstrap-t UCL	100.8
95% Hall's Bootstrap UCL	104
95% Percentile Bootstrap UCL	44.65
95% BCA Bootstrap UCL	56.68
95% Chebyshev(Mean, Sd) UCL	70.01
97.5% Chebyshev(Mean, Sd) UCL	89.86
99% Chebyshev(Mean, Sd) UCL	128.9

Potential UCL to Use	
Use 95% Chebyshev (Mean, Sd) UCL	**70.01**

Dibenz(a,h)anthracene

Total Number of Data	18
Number of Non-Detect Data	14
Number of Detected Data	**4**
Minimum Detected	0.045
Maximum Detected	0.404
Percent Non-Detects	**77.78%**
Minimum Non-detect	0.00687
Maximum Non-detect	0.0565
Mean of Detected Data	0.189
Median of Detected Data	0.153
Variance of Detected Data	0.0233
SD of Detected Data	0.153
CV of Detected Data	0.81
Skewness of Detected Data	1.295
Mean of Detected log data	-1.944
SD of Detected Log data	0.902

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	15
Number treated as Detected	3
Single DL Percent Detection	83.33%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0769
SD	0.0863
Standard Error of Mean	0.0235
95% KM (t) UCL	0.118
95% KM (z) UCL	0.116
95% KM (BCA) UCL	0.192
95% KM (Percentile Bootstrap) UCL	0.192
95% KM (Chebyshev) UCL	0.179
97.5% KM (Chebyshev) UCL	0.224
99% KM (Chebyshev) UCL	0.311

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0110**
[per recommendation in ProUCL User Guide]

Dibenzofuran

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.0862
Maximum Detected	0.0862
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.00606
Maximum Non-detect	0.083

Data set has all detected values equal to = 0.0862, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0862

**** Instead of UCL, EPC is selected to be median = <0.0152**
[per recommendation in ProUCL User Guide]

Dieldrin

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.00545
Maximum Detected	0.00545
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.000165
Maximum Non-detect	0.00246

Data set has all detected values equal to = 0.00545, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00545

**** Instead of UCL, EPC is selected to be median = <0.000183**
[per recommendation in ProUCL User Guide]

Diethyl phthalate

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.011
Maximum Detected	0.011
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.00756
Maximum Non-detect	0.0996

Data set has all detected values equal to = 0.011, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.011

**** Instead of UCL, EPC is selected to be median = <0.0185**
[per recommendation in ProUCL User Guide]

Di-n-butyl phthalate

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.01
Maximum Detected	0.01
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.00797
Maximum Non-detect	0.167

Data set has all detected values equal to = 0.01, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.01

**** Instead of UCL, EPC is selected to be median = <0.0310**
[per recommendation in ProUCL User Guide]

Di-n-octyl phthalate

Total Number of Data	18
Number of Non-Detect Data	16
Number of Detected Data	**2**
Minimum Detected	0.0154
Maximum Detected	0.123
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.00848
Maximum Non-detect	0.0487
Mean of Detected Data	0.0692
Median of Detected Data	0.0692
Variance of Detected Data	0.00579
SD of Detected Data	0.0761
CV of Detected Data	1.099
Skewness of Detected Data	N/A
Mean of Detected log data	-3.134
SD of Detected Log data	1.469

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0214
SD	0.0246
Standard Error of Mean	0.00822
95% KM (t) UCL	0.0357
95% KM (z) UCL	0.0349
95% KM (BCA) UCL	0.123
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0572
97.5% KM (Chebyshev) UCL	0.0727
99% KM (Chebyshev) UCL	0.103

Potential UCL to Use	
95% KM (BCA) UCL	0.123

**** Instead of UCL, EPC is selected to be median = <0.00950**
[per recommendation in ProUCL User Guide]

Endrin

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.00149
Maximum Detected	0.00149
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.0002
Maximum Non-detect	0.00295

Data set has all detected values equal to = 0.00149, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00149

**** Instead of UCL, EPC is selected to be median = <0.000222**
[per recommendation in ProUCL User Guide]

Endrin ketone

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.00966
Maximum Detected	0.00966
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.000495

Maximum Non-detect	0.00298

Data set has all detected values equal to = 0.00966, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00966

**** Instead of UCL, EPC is selected to be median = <0.000548**
[per recommendation in ProUCL User Guide]

Fluoranthene

Total Number of Data	18
Number of Non-Detect Data	12
Number of Detected Data	**6**
Minimum Detected	0.0214
Maximum Detected	2.19
Percent Non-Detects	**66.67%**
Minimum Non-detect	0.00676
Maximum Non-detect	0.0658
Mean of Detected Data	0.462
Median of Detected Data	0.125
Variance of Detected Data	0.724
SD of Detected Data	0.851
CV of Detected Data	1.843
Skewness of Detected Data	2.395
Mean of Detected log data	-1.942
SD of Detected Log data	1.595

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	14
Number treated as Detected	4
Single DL Percent Detection	77.78%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.168
SD	0.494
Standard Error of Mean	0.128

95% KM (t) UCL	0.39
95% KM (z) UCL	0.378
95% KM (BCA) UCL	0.447
95% KM (Percentile Bootstrap) UCL	0.416
95% KM (Chebyshev) UCL	0.725
97.5% KM (Chebyshev) UCL	0.965
99% KM (Chebyshev) UCL	1.438

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median = <0.0128**
[per recommendation in ProUCL User Guide]

Fluorene

Total Number of Data	18
Number of Non-Detect Data	15
Number of Detected Data	**3**
Minimum Detected	0.017
Maximum Detected	0.141
Percent Non-Detects	**83.33%**
Minimum Non-detect	0.00689
Maximum Non-detect	0.0575
Mean of Detected Data	0.0647
Median of Detected Data	0.036
Variance of Detected Data	0.00446
SD of Detected Data	0.0668
CV of Detected Data	1.033
Skewness of Detected Data	1.576
Mean of Detected log data	-3.119
SD of Detected Log data	1.073

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.025
SD	0.0285
Standard Error of Mean	0.00823
95% KM (t) UCL	0.0393
95% KM (z) UCL	0.0385
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.141
95% KM (Chebyshev) UCL	0.0609
97.5% KM (Chebyshev) UCL	0.0764
99% KM (Chebyshev) UCL	0.107

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0109**
[per recommendation in ProUCL User Guide]

Indeno(1,2,3-cd)pyrene

Total Number of Data	18
Number of Non-Detect Data	9
Number of Detected Data	**9**
Minimum Detected	0.02
Maximum Detected	1.51
Percent Non-Detects	**50.00%**
Minimum Non-detect	0.0165
Maximum Non-detect	0.095

Mean of Detected Data	0.289
Median of Detected Data	0.149
Variance of Detected Data	0.215
SD of Detected Data	0.464
CV of Detected Data	1.604
Skewness of Detected Data	2.851
Mean of Detected log data	-1.916
SD of Detected Log data	1.153

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	12
Number treated as Detected	6
Single DL Percent Detection	66.67%

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.155
SD	0.337
Standard Error of Mean	0.0843
95% KM (t) UCL	0.302
95% KM (z) UCL	0.294
95% KM (BCA) UCL	0.333
95% KM (Percentile Bootstrap) UCL	0.317
95% KM (Chebyshev) UCL	0.523
97.5% KM (Chebyshev) UCL	**0.682**
99% KM (Chebyshev) UCL	0.994

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Iron

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	8450
Maximum	102000
Mean	19477
Median	14700
SD	21073
Variance	4.44E+08
Coefficient of Variation	1.082
Skewness	3.929
Mean of log data	9.653
SD of log data	0.564

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	28117
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	32561
95% Modified-t UCL	28884
Non-Parametric UCLs	
95% CLT UCL	27646
95% Jackknife UCL	28117
95% Standard Bootstrap UCL	27671

95% Bootstrap-t UCL	49011
95% Hall's Bootstrap UCL	60240
95% Percentile Bootstrap UCL	29148
95% BCA Bootstrap UCL	33973
95% Chebyshev(Mean, Sd) UCL	41127
97.5% Chebyshev(Mean, Sd) UCL	50495
99% Chebyshev(Mean, Sd) UCL	68897

Potential UCL to Use	
Use 95% Chebyshev (Mean, Sd) UCL	**41127**

Lead

Number of Valid Observations	18
Number of Distinct Observations	16
Minimum	8.22
Maximum	471
Mean	57.7
Median	17.1
SD	111.1
Variance	12345
Coefficient of Variation	1.926
Skewness	3.403
Mean of log data	3.182
SD of log data	1.161

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	103.3
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	123.2
95% Modified-t UCL	106.8
Non-Parametric UCLs	
95% CLT UCL	100.8
95% Jackknife UCL	103.3
95% Standard Bootstrap UCL	98.59
95% Bootstrap-t UCL	189.9
95% Hall's Bootstrap UCL	228.1
95% Percentile Bootstrap UCL	106.1
95% BCA Bootstrap UCL	131.6
95% Chebyshev(Mean, Sd) UCL	171.9
97.5% Chebyshev(Mean, Sd) UCL	221.2
99% Chebyshev(Mean, Sd) UCL	318.3

Potential UCL to Use	
99% Chebyshev(Mean, Sd) UCL	**318.3**

Lithium

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	2.59
Maximum	26.6
Mean	16.57
Median	16.15
SD	5.136
Variance	26.38
Coefficient of Variation	0.31
Skewness	-0.697
Mean of log data	2.729
SD of log data	0.49

95% Useful UCLs	
Student's-t UCL	**18.68**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	18.35
95% Modified-t UCL	18.64
Non-Parametric UCLs	
95% CLT UCL	18.56
95% Jackknife UCL	18.68
95% Standard Bootstrap UCL	18.5
95% Bootstrap-t UCL	18.59
95% Hall's Bootstrap UCL	18.58
95% Percentile Bootstrap UCL	18.48
95% BCA Bootstrap UCL	18.33
95% Chebyshev(Mean, Sd) UCL	21.85
97.5% Chebyshev(Mean, Sd) UCL	24.13
99% Chebyshev(Mean, Sd) UCL	28.62

Data appear Normal (0.05)
May want to try Normal UCLs

Manganese

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	82.3
Maximum	1210
Mean	369.5
Median	296
SD	247.7
Variance	61331
Coefficient of Variation	0.67
Skewness	2.484
Mean of log data	5.754
SD of log data	0.565

95% Useful UCLs	
Student's-t UCL	471
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	502
95% Modified-t UCL	476.7
Non-Parametric UCLs	
95% CLT UCL	465.5
95% Jackknife UCL	471
95% Standard Bootstrap UCL	463.6
95% Bootstrap-t UCL	537.6
95% Hall's Bootstrap UCL	893.1
95% Percentile Bootstrap UCL	466.1
95% BCA Bootstrap UCL	496.7
95% Chebyshev(Mean, Sd) UCL	623.9
97.5% Chebyshev(Mean, Sd) UCL	**734**
99% Chebyshev(Mean, Sd) UCL	950.3

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Mercury

Total Number of Data	18
Number of Non-Detect Data	10
Number of Detected Data	**8**
Minimum Detected	0.006
Maximum Detected	0.064
Percent Non-Detects	**55.56%**
Minimum Non-detect	0.0023
Maximum Non-detect	0.025
Mean of Detected Data	0.0229
Median of Detected Data	0.0165
Variance of Detected Data	3.98E-04
SD of Detected Data	0.0199
CV of Detected Data	0.872
Skewness of Detected Data	1.451
Mean of Detected log data	-4.096
SD of Detected Log data	0.853

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	15
Number treated as Detected	3
Single DL Percent Detection	83.33%

Warning: There are only 8 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0138
SD	0.0149
Standard Error of Mean	0.00379
95% KM (t) UCL	0.0204
95% KM (z) UCL	0.0201
95% KM (BCA) UCL	0.0227
95% KM (Percentile Bootstrap) UCL	0.0213
95% KM (Chebyshev) UCL	0.0303
97.5% KM (Chebyshev) UCL	**0.0375**
99% KM (Chebyshev) UCL	0.0515

Data appear Normal (0.05)
May want to try Normal UCLs

Molybdenum

Total Number of Data	18
Number of Non-Detect Data	7
Number of Detected Data	**11**
Minimum Detected	0.085
Maximum Detected	10.7
Percent Non-Detects	**38.89%**
Minimum Non-detect	0.074
Maximum Non-detect	0.084
Mean of Detected Data	1.527
Median of Detected Data	0.26
Variance of Detected Data	9.681
SD of Detected Data	3.111
CV of Detected Data	2.038
Skewness of Detected Data	3.066
Mean of Detected log data	-0.802
SD of Detected Log data	1.546

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	1.546
Mean	0.112
SD	0.0267
95% Winsor (t) UCL	0.127
Kaplan Meier (KM) Method	
Mean	0.966
SD	2.423
Standard Error of Mean	0.599
95% KM (t) UCL	2.008
95% KM (z) UCL	1.951
95% KM (BCA) UCL	2.184
95% KM (Percentile Bootstrap) UCL	2.068
95% KM (Chebyshev) UCL	3.577
97.5% KM (Chebyshev) UCL	**4.707**
99% KM (Chebyshev) UCL	6.927

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Nickel

Number of Valid Observations	18
Number of Distinct Observations	17
Minimum	11.7
Maximum	51.7
Mean	17.04
Median	14.6
SD	9.054
Variance	81.97
Coefficient of Variation	0.531
Skewness	3.644
Mean of log data	2.762
SD of log data	0.343

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	20.76
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	22.51
95% Modified-t UCL	21.06
Non-Parametric UCLs	
95% CLT UCL	20.55
95% Jackknife UCL	20.76
95% Standard Bootstrap UCL	20.47
95% Bootstrap-t UCL	27.18
95% Hall's Bootstrap UCL	33.8
95% Percentile Bootstrap UCL	20.98

95% BCA Bootstrap UCL	23.37
95% Chebyshev(Mean, Sd) UCL	26.35
97.5% Chebyshev(Mean, Sd) UCL	30.37
99% Chebyshev(Mean, Sd) UCL	38.28

Potential UCL to Use

Use 95% Student's-t UCL	20.76
Or 95% Modified-t UCL	**21.06**

Phenanthrene

Total Number of Data	18
Number of Non-Detect Data	11
Number of Detected Data	**7**
Minimum Detected	0.018
Maximum Detected	1.34
Percent Non-Detects	**61.11%**
Minimum Non-detect	0.00729
Maximum Non-detect	0.0727

Mean of Detected Data	0.266
Median of Detected Data	0.041
Variance of Detected Data	0.231
SD of Detected Data	0.481
CV of Detected Data	1.805
Skewness of Detected Data	2.482
Mean of Detected log data	-2.452
SD of Detected Log data	1.542

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	15
Number treated as Detected	3
Single DL Percent Detection	83.33%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.115
SD	0.303
Standard Error of Mean	0.0771
95% KM (t) UCL	0.249

95% KM (z) UCL	0.242
95% KM (BCA) UCL	0.265
95% KM (Percentile Bootstrap) UCL	0.261
95% KM (Chebyshev) UCL	0.451
97.5% KM (Chebyshev) UCL	0.596
99% KM (Chebyshev) UCL	0.882

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

** Instead of UCL, EPC is selected to be median = <0.0142
[per recommendation in ProUCL User Guide]

Pyrene

Total Number of Data	19
Number of Non-Detect Data	10
Number of Detected Data	**9**
Minimum Detected	0.0149
Maximum Detected	4.64
Percent Non-Detects	**52.63%**
Minimum Non-detect	0.0122
Maximum Non-detect	0.0702
Mean of Detected Data	0.798
Median of Detected Data	0.091
Variance of Detected Data	2.426
SD of Detected Data	1.558
CV of Detected Data	1.951
Skewness of Detected Data	2.356
Mean of Detected log data	-1.978
SD of Detected Log data	2.019

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	13
Number treated as Detected	6
Single DL Percent Detection	68.42%

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.386
SD	1.084
Standard Error of Mean	0.264
95% KM (t) UCL	0.843
95% KM (z) UCL	0.82
95% KM (BCA) UCL	0.898
95% KM (Percentile Bootstrap) UCL	0.866
95% KM (Chebyshev) UCL	1.536
97.5% KM (Chebyshev) UCL	**2.033**
99% KM (Chebyshev) UCL	3.01

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Silver

Total Number of Data	18
Number of Non-Detect Data	16
Number of Detected Data	**2**
Minimum Detected	0.092
Maximum Detected	0.41
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.027
Maximum Non-detect	0.15

Mean of Detected Data	0.251
Median of Detected Data	0.251
Variance of Detected Data	0.0506
SD of Detected Data	0.225
CV of Detected Data	0.896
Skewness of Detected Data	N/A
Mean of Detected log data	-1.639
SD of Detected Log data	1.057

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.11
SD	0.0728
Standard Error of Mean	0.0243
95% KM (t) UCL	0.152
95% KM (z) UCL	0.15
95% KM (BCA) UCL	0.41
95% KM (Percentile Bootstrap) UCL	0.41
95% KM (Chebyshev) UCL	0.216
97.5% KM (Chebyshev) UCL	0.261
99% KM (Chebyshev) UCL	0.351
Potential UCL to Use	
95% KM (BCA) UCL	0.41
**** Instead of UCL, EPC is selected to be median =**	**<0.0600**
[per recommendation in ProUCL User Guide]	

Strontium

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	26.6
Maximum	93.6
Mean	57.32
Median	52.85
SD	19.7
Variance	388.2
Coefficient of Variation	0.344
Skewness	0.325
Mean of log data	3.989
SD of log data	0.364
95% Useful UCLs	
Student's-t UCL	**65.4**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	65.34
95% Modified-t UCL	65.45
Non-Parametric UCLs	
95% CLT UCL	64.96

95% Jackknife UCL	65.4
95% Standard Bootstrap UCL	64.55
95% Bootstrap-t UCL	66.09
95% Hall's Bootstrap UCL	65.38
95% Percentile Bootstrap UCL	64.71
95% BCA Bootstrap UCL	64.87
95% Chebyshev(Mean, Sd) UCL	77.56
97.5% Chebyshev(Mean, Sd) UCL	86.32
99% Chebyshev(Mean, Sd) UCL	103.5

Data appear Normal (0.05)
May want to try Normal UCLs

Thallium

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.63
Maximum Detected	0.63
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.091
Maximum Non-detect	0.89

Data set has all detected values equal to = 0.63, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.63

**** Instead of UCL, EPC is selected to be median = <0.100**
[per recommendation in ProUCL User Guide]

Tin

Total Number of Data	18
Number of Non-Detect Data	14
Number of Detected Data	**4**
Minimum Detected	0.68
Maximum Detected	3.67
Percent Non-Detects	**77.78%**
Minimum Non-detect	0.39
Maximum Non-detect	2.17
Mean of Detected Data	1.673
Median of Detected Data	1.17
Variance of Detected Data	1.962
SD of Detected Data	1.401
CV of Detected Data	0.837
Skewness of Detected Data	1.487
Mean of Detected log data	0.267

SD of Detected Log data	0.795

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.904
SD	0.706
Standard Error of Mean	0.193
95% KM (t) UCL	1.239
95% KM (z) UCL	1.221
95% KM (BCA) UCL	3.67
95% KM (Percentile Bootstrap) UCL	1.848
95% KM (Chebyshev) UCL	1.744
97.5% KM (Chebyshev) UCL	2.108
99% KM (Chebyshev) UCL	2.822

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.590**
[per recommendation in ProUCL User Guide]

Titanium

Number of Valid Observations	18
Number of Distinct Observations	17
Minimum	3.41
Maximum	55.9
Mean	20.67
Median	18.7
SD	11.65
Variance	135.7
Coefficient of Variation	0.563
Skewness	1.656
Mean of log data	2.882
SD of log data	0.591

95% Useful UCLs	
Student's-t UCL	25.45
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	26.33
95% Modified-t UCL	25.63
Non-Parametric UCLs	
95% CLT UCL	25.19
95% Jackknife UCL	25.45
95% Standard Bootstrap UCL	24.96
95% Bootstrap-t UCL	27.41
95% Hall's Bootstrap UCL	33.8
95% Percentile Bootstrap UCL	25.5
95% BCA Bootstrap UCL	26.63
95% Chebyshev(Mean, Sd) UCL	32.64
97.5% Chebyshev(Mean, Sd) UCL	**37.82**
99% Chebyshev(Mean, Sd) UCL	47.99

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Vanadium

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	7.85
Maximum	45.8
Mean	19.66
Median	18.65
SD	9.126
Variance	83.28
Coefficient of Variation	0.464
Skewness	1.322
Mean of log data	2.884
SD of log data	0.449
95% Useful UCLs	
Student's-t UCL	**23.4**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	23.91
95% Modified-t UCL	23.51
Non-Parametric UCLs	
95% CLT UCL	23.2
95% Jackknife UCL	23.4
95% Standard Bootstrap UCL	23.07
95% Bootstrap-t UCL	24.51
95% Hall's Bootstrap UCL	25.38

95% Percentile Bootstrap UCL	23.28
95% BCA Bootstrap UCL	23.91
95% Chebyshev(Mean, Sd) UCL	29.03
97.5% Chebyshev(Mean, Sd) UCL	33.09
99% Chebyshev(Mean, Sd) UCL	41.06

Data appear Normal (0.05)
May want to try Normal UCLs

Zinc

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	29.5
Maximum	5640
Mean	418.4
Median	53.95
SD	1308
Variance	1709718
Coefficient of Variation	3.125
Skewness	4.195
Mean of log data	4.562
SD of log data	1.321

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	954.5
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	1251
95% Modified-t UCL	1005
Non-Parametric UCLs	
95% CLT UCL	925.3
95% Jackknife UCL	954.5
95% Standard Bootstrap UCL	913.4
95% Bootstrap-t UCL	5677
95% Hall's Bootstrap UCL	3640
95% Percentile Bootstrap UCL	1029
95% BCA Bootstrap UCL	1364
95% Chebyshev(Mean, Sd) UCL	1762
97.5% Chebyshev(Mean, Sd) UCL	2343
99% Chebyshev(Mean, Sd) UCL	3485

Potential UCL to Use
99% Chebyshev(Mean, Sd) UCL **3485**

APPENDIX A-4

NORTH OF MARLIN SOIL

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options		
From File	C:\Users\Michael\ . . . . \ProUCL data analysis\North of Marlin Soil Boring\North of Marlin Soil - all data_ProUCL input.wst	
Full Precision	OFF	
Confidence Coefficient	95%	
Number of Bootstrap Operations	2000	

1,1-Dichloroethane

Total Number of Data	21
Number of Non-Detect Data	18
Number of Detected Data	**3**
Minimum Detected	0.00161
Maximum Detected	0.518
Percent Non-Detects	**85.71%**
Minimum Non-detect	1.28E-04
Maximum Non-detect	0.186
Mean of Detected Data	0.177
Median of Detected Data	0.0121
Variance of Detected Data	0.0871
SD of Detected Data	0.295
CV of Detected Data	1.665
Skewness of Detected Data	1.73
Mean of Detected log data	-3.835
SD of Detected Log data	2.93

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	20
Number treated as Detected	1
Single DL Percent Detection	95.24%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0267
SD	0.11

Standard Error of Mean	0.0294
95% KM (t) UCL	0.0774
95% KM (z) UCL	0.075
95% KM (BCA) UCL	0.518
95% KM (Percentile Bootstrap) UCL	0.518
95% KM (Chebyshev) UCL	0.155
97.5% KM (Chebyshev) UCL	0.21
99% KM (Chebyshev) UCL	0.319

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

**** Instead of UCL, EPC is selected to be median = <0.000175**
[per recommendation in ProUCL User Guide]

1,1-Dichloroethene

Total Number of Data	21
Number of Non-Detect Data	19
Number of Detected Data	**2**
Minimum Detected	0.00178
Maximum Detected	0.313
Percent Non-Detects	**90.48%**
Minimum Non-detect	2.90E-04
Maximum Non-detect	0.419

Mean of Detected Data	0.157
Median of Detected Data	0.157
Variance of Detected Data	0.0484
SD of Detected Data	0.22
CV of Detected Data	1.398
Skewness of Detected Data	N/A
Mean of Detected log data	-3.746
SD of Detected Log data	3.655

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	21
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0173
SD	0.0678
Standard Error of Mean	0.0214
95% KM (t) UCL	0.0543
95% KM (z) UCL	0.0526
95% KM (BCA) UCL	0.313
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.111
97.5% KM (Chebyshev) UCL	0.151
99% KM (Chebyshev) UCL	0.231

Potential UCL to Use	
99% KM (Chebyshev) UCL	0.231

**** Instead of UCL, EPC is selected to be median = <0.000392**
[per recommendation in ProUCL User Guide]

1,2-Dichloroethane

Total Number of Data	21
Number of Non-Detect Data	16
Number of Detected Data	**5**
Minimum Detected	0.00231
Maximum Detected	0.178
Percent Non-Detects	**76.19%**
Minimum Non-detect	9.20E-05
Maximum Non-detect	0.133

Mean of Detected Data	0.0744
Median of Detected Data	0.011
Variance of Detected Data	0.00887
SD of Detected Data	0.0942
CV of Detected Data	1.266
Skewness of Detected Data	0.603
Mean of Detected log data	-3.934
SD of Detected Log data	2.091

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	19
Number treated as Detected	2
Single DL Percent Detection	90.48%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0195
SD	0.0513
Standard Error of Mean	0.0125
95% KM (t) UCL	0.0411
95% KM (z) UCL	0.0401
95% KM (BCA) UCL	0.177
95% KM (Percentile Bootstrap) UCL	0.0507
95% KM (Chebyshev) UCL	0.0741
97.5% KM (Chebyshev) UCL	0.0977
99% KM (Chebyshev) UCL	0.144

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median = <0.000127**
[per recommendation in ProUCL User Guide]

2-Butanone

Total Number of Data	21
Number of Non-Detect Data	10
Number of Detected Data	**11**
Minimum Detected	0.0017
Maximum Detected	0.208
Percent Non-Detects	**47.62%**
Minimum Non-detect	2.52E-04
Maximum Non-detect	0.364

Mean of Detected Data	0.0222
Median of Detected Data	0.00299
Variance of Detected Data	0.0038
SD of Detected Data	0.0617
CV of Detected Data	2.78
Skewness of Detected Data	3.312
Mean of Detected log data	-5.351
SD of Detected Log data	1.327

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	21
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0132
SD	0.0447
Standard Error of Mean	0.0105
95% KM (t) UCL	0.0313
95% KM (z) UCL	0.0305
95% KM (BCA) UCL	0.0339
95% KM (Percentile Bootstrap) UCL	0.0327
95% KM (Chebyshev) UCL	0.0589
97.5% KM (Chebyshev) UCL	0.0787
99% KM (Chebyshev) UCL	0.118

Potential UCL to Use	
97.5% KM (Chebyshev) UCL	**0.0787**

2-Methylnaphthalene

Total Number of Data	38
Number of Non-Detect Data	32
Number of Detected Data	**6**
Minimum Detected	0.01
Maximum Detected	1.04
Percent Non-Detects	**84.21%**
Minimum Non-detect	0.01
Maximum Non-detect	0.0634

Mean of Detected Data	0.202
Median of Detected Data	0.0493
Variance of Detected Data	0.169
SD of Detected Data	0.411
CV of Detected Data	2.029
Skewness of Detected Data	2.437
Mean of Detected log data	-2.979
SD of Detected Log data	1.651

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	37
Number treated as Detected	1
Single DL Percent Detection	97.37%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0405
SD	0.165
Standard Error of Mean	0.0293
95% KM (t) UCL	0.0899
95% KM (z) UCL	0.0886
95% KM (BCA) UCL	1.04
95% KM (Percentile Bootstrap) UCL	0.0983
95% KM (Chebyshev) UCL	0.168
97.5% KM (Chebyshev) UCL	0.223
99% KM (Chebyshev) UCL	0.332

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0119**
[per recommendation in ProUCL User Guide]

4,4'-DDE

Total Number of Data	38
Number of Non-Detect Data	36
Number of Detected Data	**2**
Minimum Detected	0.00216
Maximum Detected	0.0149
Percent Non-Detects	**94.74%**
Minimum Non-detect	3.79E-04
Maximum Non-detect	0.054

Mean of Detected Data	0.00853
Median of Detected Data	0.00853
Variance of Detected Data	8.12E-05
SD of Detected Data	0.00901
CV of Detected Data	1.056
Skewness of Detected Data	N/A
Mean of Detected log data	-5.172
SD of Detected Log data	1.366

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),	
Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	38
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0025
SD	0.00207
Standard Error of Mean	4.80E-04
95% KM (t) UCL	0.00331
95% KM (z) UCL	0.00329
95% KM (BCA) UCL	0.0149
95% KM (Percentile Bootstrap) UCL	0.0149
95% KM (Chebyshev) UCL	0.0046
97.5% KM (Chebyshev) UCL	0.0055
99% KM (Chebyshev) UCL	0.00728

Potential UCL to Use	
95% KM (BCA) UCL	0.0149

**** Instead of UCL, EPC is selected to be median = <0.000428**
[per recommendation in ProUCL User Guide]

4,4'-DDT

Total Number of Data	38
Number of Non-Detect Data	29
Number of Detected Data	**9**
Minimum Detected	0.000597

Maximum Detected	0.395
Percent Non-Detects	**76.32%**
Minimum Non-detect	1.46E-04
Maximum Non-detect	0.00282

Mean of Detected Data	0.0471
Median of Detected Data	0.00145
Variance of Detected Data	0.017
SD of Detected Data	0.131
CV of Detected Data	2.771
Skewness of Detected Data	2.995
Mean of Detected log data	-5.592
SD of Detected Log data	2.035

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	34
Number treated as Detected	4
Single DL Percent Detection	89.47%

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0116
SD	0.0631
Standard Error of Mean	0.0109
95% KM (t) UCL	0.0299
95% KM (z) UCL	0.0295
95% KM (BCA) UCL	0.0329
95% KM (Percentile Bootstrap) UCL	0.0323
95% KM (Chebyshev) UCL	0.0589
97.5% KM (Chebyshev) UCL	0.0794
99% KM (Chebyshev) UCL	0.12

Potential UCL to Use
99% KM (Chebyshev) UCL **0.12**

Acenaphthene

Total Number of Data	38
Number of Non-Detect Data	33
Number of Detected Data	**5**

Minimum Detected	0.013
Maximum Detected	0.157
Percent Non-Detects	**86.84%**
Minimum Non-detect	0.00998
Maximum Non-detect	0.125
Mean of Detected Data	0.0648
Median of Detected Data	0.027
Variance of Detected Data	0.00406
SD of Detected Data	0.0637
CV of Detected Data	0.983
Skewness of Detected Data	0.93
Mean of Detected log data	-3.183
SD of Detected Log data	1.078

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	37
Number treated as Detected	1
Single DL Percent Detection	97.37%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0199
SD	0.0272
Standard Error of Mean	0.00495
95% KM (t) UCL	0.0283
95% KM (z) UCL	0.0281
95% KM (BCA) UCL	0.107
95% KM (Percentile Bootstrap) UCL	0.0407
95% KM (Chebyshev) UCL	0.0415
97.5% KM (Chebyshev) UCL	0.0508
99% KM (Chebyshev) UCL	0.0692

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0111**
[per recommendation in ProUCL User Guide]

Acenaphthylene

Total Number of Data	38
Number of Non-Detect Data	37
Number of Detected Data	**1**
Minimum Detected	0.0555
Maximum Detected	0.0555
Percent Non-Detects	**97.37%**
Minimum Non-detect	0.00768
Maximum Non-detect	0.09

Data set has all detected values equal to = 0.0555, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0555

**** Instead of UCL, EPC is selected to be median = <0.0120**
[per recommendation in ProUCL User Guide]

Aluminum

Number of Valid Observations	39
Number of Distinct Observations	34
Minimum	1810
Maximum	18300
Mean	12268
Median	12600
SD	3987
Variance	15892441
Coefficient of Variation	0.325
Skewness	-0.344
Mean of log data	9.344
SD of log data	0.431

95% Useful UCLs	
Student's-t UCL	**13344**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	13281
95% Modified-t UCL	13339
Non-Parametric UCLs	
95% CLT UCL	13318
95% Jackknife UCL	13344
95% Standard Bootstrap UCL	13305
95% Bootstrap-t UCL	13336
95% Hall's Bootstrap UCL	13249
95% Percentile Bootstrap UCL	13267
95% BCA Bootstrap UCL	13253
95% Chebyshev(Mean, Sd) UCL	15051
97.5% Chebyshev(Mean, Sd) UCL	16255
99% Chebyshev(Mean, Sd) UCL	18620

Data appear Normal (0.05)
May want to try Normal UCLs

Anthracene

Total Number of Data	38
Number of Non-Detect Data	30
Number of Detected Data	**8**
Minimum Detected	0.00887
Maximum Detected	0.264
Percent Non-Detects	**78.95%**
Minimum Non-detect	0.00744
Maximum Non-detect	0.0641

Mean of Detected Data	0.104
Median of Detected Data	0.0565
Variance of Detected Data	0.00876
SD of Detected Data	0.0936
CV of Detected Data	0.899
Skewness of Detected Data	0.812
Mean of Detected log data	-2.719
SD of Detected Log data	1.124

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	35
Number treated as Detected	3
Single DL Percent Detection	92.11%

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.029
SD	0.0559
Standard Error of Mean	0.0097
95% KM (t) UCL	0.0454
95% KM (z) UCL	0.045
95% KM (BCA) UCL	0.0731
95% KM (Percentile Bootstrap) UCL	0.064
95% KM (Chebyshev) UCL	0.0713
97.5% KM (Chebyshev) UCL	**0.0896**

99% KM (Chebyshev) UCL	0.126

Data appear Normal (0.05)
May want to try Normal UCLs

Antimony

Total Number of Data	39
Number of Non-Detect Data	20
Number of Detected Data	**19**
Minimum Detected	0.22
Maximum Detected	8.09
Percent Non-Detects	**51.28%**
Minimum Non-detect	0.19
Maximum Non-detect	0.26
Mean of Detected Data	2.753
Median of Detected Data	2.56
Variance of Detected Data	2.663
SD of Detected Data	1.632
CV of Detected Data	0.593
Skewness of Detected Data	1.815
Mean of Detected log data	0.798
SD of Detected Log data	0.807

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	21
Number treated as Detected	18
Single DL Percent Detection	53.85%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	1.454
SD	1.683
Standard Error of Mean	0.277
95% KM (t) UCL	1.921
95% KM (z) UCL	1.91
95% KM (BCA) UCL	2.662
95% KM (Percentile Bootstrap) UCL	2.454
95% KM (Chebyshev) UCL	2.661
97.5% KM (Chebyshev) UCL	3.183
99% KM (Chebyshev) UCL	4.209

Potential UCL to Use

95% KM (t) UCL	1.921

95% KM (% Bootstrap) UCL	2.454

Aroclor-1254

Total Number of Data	38
Number of Non-Detect Data	35
Number of Detected Data	**3**
Minimum Detected	0.0122
Maximum Detected	6.35
Percent Non-Detects	**92.11%**
Minimum Non-detect	0.00379
Maximum Non-detect	0.033

Mean of Detected Data	2.152
Median of Detected Data	0.0938
Variance of Detected Data	13.22
SD of Detected Data	3.636
CV of Detected Data	1.689
Skewness of Detected Data	1.731
Mean of Detected log data	-1.641
SD of Detected Log data	3.19

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	36
Number treated as Detected	2
Single DL Percent Detection	94.74%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A	
Kaplan Meier (KM) Method		
Mean		0.181
SD		1.014
Standard Error of Mean		0.202
95% KM (t) UCL		0.521
95% KM (z) UCL		0.513
95% KM (BCA) UCL	N/A	
95% KM (Percentile Bootstrap) UCL	N/A	

95% KM (Chebyshev) UCL	1.059
97.5% KM (Chebyshev) UCL	1.44
99% KM (Chebyshev) UCL	2.186

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

**** Instead of UCL, EPC is selected to be median = <0.00430**
[per recommendation in ProUCL User Guide]

Arsenic

Total Number of Data	39
Number of Non-Detect Data	6
Number of Detected Data	**33**
Minimum Detected	0.54
Maximum Detected	5.69
Percent Non-Detects	**15.38%**
Minimum Non-detect	0.15
Maximum Non-detect	0.68

Mean of Detected Data	2.83
Median of Detected Data	2.55
Variance of Detected Data	1.311
SD of Detected Data	1.145
CV of Detected Data	0.405
Skewness of Detected Data	0.914
Mean of Detected log data	0.956
SD of Detected Log data	0.441

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	7
Number treated as Detected	32
Single DL Percent Detection	17.95%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	17.95%
Mean	2.436
SD	0.738
95% Winsor (t) UCL	2.638

Kaplan Meier (KM) Method

Mean	2.477
SD	1.326
Standard Error of Mean	0.216
95% KM (t) UCL	2.841
95% KM (z) UCL	2.832

95% KM (BCA) UCL	2.994
95% KM (Percentile Bootstrap) UCL	2.905
95% KM (Chebyshev) UCL	3.417
97.5% KM (Chebyshev) UCL	**3.824**
99% KM (Chebyshev) UCL	4.623

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Barium

Number of Valid Observations	39
Number of Distinct Observations	33
Minimum	46.1
Maximum	476
Mean	141
Median	123
SD	93.22
Variance	8690
Coefficient of Variation	0.661
Skewness	2.335
Mean of log data	4.799
SD of log data	0.523
95% Useful UCLs	
Student's-t UCL	166.1
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	171.5
95% Modified-t UCL	167.1
Non-Parametric UCLs	
95% CLT UCL	165.5
95% Jackknife UCL	166.1
95% Standard Bootstrap UCL	164.9
95% Bootstrap-t UCL	176.3
95% Hall's Bootstrap UCL	184.8
95% Percentile Bootstrap UCL	165.8
95% BCA Bootstrap UCL	173.7
95% Chebyshev(Mean, Sd) UCL	206
97.5% Chebyshev(Mean, Sd) UCL	**234.2**
99% Chebyshev(Mean, Sd) UCL	289.5

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Benzene

Total Number of Data	21
Number of Non-Detect Data	9

Number of Detected Data	**12**
Minimum Detected	0.00138
Maximum Detected	0.00632
Percent Non-Detects	**42.86%**
Minimum Non-detect	9.00E-05
Maximum Non-detect	0.121
Mean of Detected Data	0.00357
Median of Detected Data	0.00299
Variance of Detected Data	2.98E-06
SD of Detected Data	0.00173
CV of Detected Data	0.484
Skewness of Detected Data	0.473
Mean of Detected log data	-5.752
SD of Detected Log data	0.517

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	21
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.00292
SD	0.0016
Standard Error of Mean	3.95E-04
95% KM (t) UCL	0.0036
95% KM (z) UCL	0.00357
95% KM (BCA) UCL	0.00371
95% KM (Percentile Bootstrap) UCL	0.00361
95% KM (Chebyshev) UCL	0.00464
97.5% KM (Chebyshev) UCL	**0.00539**
99% KM (Chebyshev) UCL	0.00685

Data appear Normal (0.05)
May want to try Normal UCLs

Benzo(a)anthracene

Total Number of Data	38
Number of Non-Detect Data	33
Number of Detected Data	**5**
Minimum Detected	0.0383
Maximum Detected	1.18
Percent Non-Detects	**86.84%**

Minimum Non-detect	0.00503
Maximum Non-detect	0.0596
Mean of Detected Data	0.576
Median of Detected Data	0.611
Variance of Detected Data	0.219
SD of Detected Data	0.468
CV of Detected Data	0.813
Skewness of Detected Data	0.128
Mean of Detected log data	-1.075
SD of Detected Log data	1.398

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	34
Number treated as Detected	4
Single DL Percent Detection	89.47%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.109
SD	0.237
Standard Error of Mean	0.043
95% KM (t) UCL	0.182
95% KM (z) UCL	0.18
95% KM (BCA) UCL	0.864
95% KM (Percentile Bootstrap) UCL	0.671
95% KM (Chebyshev) UCL	0.296
97.5% KM (Chebyshev) UCL	0.377
99% KM (Chebyshev) UCL	0.537

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0111**
[per recommendation in ProUCL User Guide]

Benzo(a)pyrene

Total Number of Data	38
Number of Non-Detect Data	28

Number of Detected Data	**10**
Minimum Detected	0.0135
Maximum Detected	1.42
Percent Non-Detects	**73.68%**
Minimum Non-detect	0.00901
Maximum Non-detect	0.1

Mean of Detected Data	0.318
Median of Detected Data	0.107
Variance of Detected Data	0.223
SD of Detected Data	0.472
CV of Detected Data	1.484
Skewness of Detected Data	1.951
Mean of Detected log data	-2.019
SD of Detected Log data	1.398

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs

Number treated as Non-Detect	31
Number treated as Detected	7
Single DL Percent Detection	81.58%

Data Dsitribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0937
SD	0.266
Standard Error of Mean	0.0455
95% KM (t) UCL	0.17
95% KM (z) UCL	0.169
95% KM (BCA) UCL	0.226
95% KM (Percentile Bootstrap) UCL	0.183
95% KM (Chebyshev) UCL	0.292
97.5% KM (Chebyshev) UCL	**0.378**
99% KM (Chebyshev) UCL	0.546

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Benzo(b)fluoranthene

Total Number of Data	38
Number of Non-Detect Data	26
Number of Detected Data	**12**
Minimum Detected	0.0487
Maximum Detected	1.62
Percent Non-Detects	**68.42%**

Minimum Non-detect	0.00721
Maximum Non-detect	0.137
Mean of Detected Data	0.349
Median of Detected Data	0.148
Variance of Detected Data	0.237
SD of Detected Data	0.487
CV of Detected Data	1.397
Skewness of Detected Data	2.223
Mean of Detected log data	-1.63
SD of Detected Log data	1

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	31
Number treated as Detected	7
Single DL Percent Detection	81.58%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.144
SD	0.297
Standard Error of Mean	0.0503
95% KM (t) UCL	0.229
95% KM (z) UCL	0.226
95% KM (BCA) UCL	0.293
95% KM (Percentile Bootstrap) UCL	0.252
95% KM (Chebyshev) UCL	0.363
97.5% KM (Chebyshev) UCL	0.458
99% KM (Chebyshev) UCL	0.644

Potential UCL to Use

95% KM (t) UCL	0.229
95% KM (% Bootstrap) UCL	**0.252**

Benzo(g,h,i)perylene

Total Number of Data	38
Number of Non-Detect Data	24
Number of Detected Data	**14**
Minimum Detected	0.0237
Maximum Detected	1.28
Percent Non-Detects	**63.16%**
Minimum Non-detect	0.00933
Maximum Non-detect	0.101

Mean of Detected Data	0.239
Median of Detected Data	0.0895
Variance of Detected Data	0.119
SD of Detected Data	0.345
CV of Detected Data	1.448
Skewness of Detected Data	2.504
Mean of Detected log data	-2.129
SD of Detected Log data	1.17

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs

Number treated as Non-Detect	33
Number treated as Detected	5
Single DL Percent Detection	86.84%

Data Dsitribution Test with Detected Values Only

Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.103
SD	0.227
Standard Error of Mean	0.0382
95% KM (t) UCL	0.168
95% KM (z) UCL	0.166
95% KM (BCA) UCL	0.188
95% KM (Percentile Bootstrap) UCL	0.174
95% KM (Chebyshev) UCL	0.27
97.5% KM (Chebyshev) UCL	**0.342**
99% KM (Chebyshev) UCL	0.483

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

Benzo(k)fluoranthene

Total Number of Data	38
Number of Non-Detect Data	32
Number of Detected Data	**6**
Minimum Detected	0.068
Maximum Detected	0.799
Percent Non-Detects	**84.21%**
Minimum Non-detect	0.011
Maximum Non-detect	0.124

Mean of Detected Data	0.314
Median of Detected Data	0.137
Variance of Detected Data	0.108
SD of Detected Data	0.328

Mean of Detected Data	0.75
Median of Detected Data	0.69
Variance of Detected Data	0.202
SD of Detected Data	0.449
CV of Detected Data	0.599
Skewness of Detected Data	3.001
Mean of Detected log data	-0.44
SD of Detected Log data	0.608

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	0.608
Mean	0.671
SD	0.307
95% Winsor (t) UCL	0.754

Kaplan Meier (KM) Method	
Mean	0.715
SD	0.457
Standard Error of Mean	0.0742
95% KM (t) UCL	0.84
95% KM (z) UCL	0.837
95% KM (BCA) UCL	0.851
95% KM (Percentile Bootstrap) UCL	0.839
95% KM (Chebyshev) UCL	1.038
97.5% KM (Chebyshev) UCL	**1.178**
99% KM (Chebyshev) UCL	1.453

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Bis(2-Ethylhexyl)phthalate

Total Number of Data	38
Number of Non-Detect Data	26
Number of Detected Data	**12**
Minimum Detected	0.0122
Maximum Detected	0.239
Percent Non-Detects	**68.42%**
Minimum Non-detect	0.013
Maximum Non-detect	0.54

Mean of Detected Data	0.0795
Median of Detected Data	0.0546
Variance of Detected Data	0.00471
SD of Detected Data	0.0686

CV of Detected Data	1.043
Skewness of Detected Data	1.006
Mean of Detected log data	-1.639
SD of Detected Log data	1.066

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	34
Number treated as Detected	4
Single DL Percent Detection	89.47%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.107
SD	0.149
Standard Error of Mean	0.0265
95% KM (t) UCL	0.152
95% KM (z) UCL	0.15
95% KM (BCA) UCL	0.67
95% KM (Percentile Bootstrap) UCL	0.18
95% KM (Chebyshev) UCL	0.222
97.5% KM (Chebyshev) UCL	0.272
99% KM (Chebyshev) UCL	0.37

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median = <0.0172**
[per recommendation in ProUCL User Guide]

Beryllium

Total Number of Data	39
Number of Non-Detect Data	2
Number of Detected Data	**37**
Minimum Detected	0.066
Maximum Detected	2.88
Percent Non-Detects	**5.13%**
Minimum Non-detect	0.02
Maximum Non-detect	0.026

CV of Detected Data	0.863
Skewness of Detected Data	1.287
Mean of Detected log data	-2.888
SD of Detected Log data	0.918

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	38
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.0412
SD	0.0472
Standard Error of Mean	0.00871
95% KM (t) UCL	0.0559
95% KM (z) UCL	0.0555
95% KM (BCA) UCL	0.0609
95% KM (Percentile Bootstrap) UCL	0.0584
95% KM (Chebyshev) UCL	0.0792
97.5% KM (Chebyshev) UCL	**0.0956**
99% KM (Chebyshev) UCL	0.128

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Boron

Total Number of Data	39
Number of Non-Detect Data	10
Number of Detected Data	**29**
Minimum Detected	3.14
Maximum Detected	39.2
Percent Non-Detects	**25.64%**
Minimum Non-detect	1.11
Maximum Non-detect	1.3

Mean of Detected Data	11.22
Median of Detected Data	9.21
Variance of Detected Data	67.05
SD of Detected Data	8.189
CV of Detected Data	0.73
Skewness of Detected Data	1.832
Mean of Detected log data	2.199
SD of Detected Log data	0.668

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	0.668
Mean	7.644
SD	4.488
95% Winsor (t) UCL	8.89

Kaplan Meier (KM) Method	
Mean	9.152
SD	7.785
Standard Error of Mean	1.269
95% KM (t) UCL	11.29
95% KM (z) UCL	11.24
95% KM (BCA) UCL	11.42
95% KM (Percentile Bootstrap) UCL	11.44
95% KM (Chebyshev) UCL	14.68
97.5% KM (Chebyshev) UCL	**17.07**
99% KM (Chebyshev) UCL	21.77

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Bromoform

Total Number of Data	21
Number of Non-Detect Data	19
Number of Detected Data	**2**
Minimum Detected	0.011
Maximum Detected	0.018
Percent Non-Detects	**90.48%**
Minimum Non-detect	1.37E-04
Maximum Non-detect	0.197

Mean of Detected Data	0.0145
Median of Detected Data	0.0145
Variance of Detected Data	2.45E-05
SD of Detected Data	0.00495
CV of Detected Data	0.341
Skewness of Detected Data	N/A
Mean of Detected log data	-4.264
SD of Detected Log data	0.348

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	21
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0114
SD	0.00153
Standard Error of Mean	4.82E-04
95% KM (t) UCL	0.0122
95% KM (z) UCL	0.0121
95% KM (BCA) UCL	0.018
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0135
97.5% KM (Chebyshev) UCL	0.0144
99% KM (Chebyshev) UCL	0.0162
Potential UCL to Use	
95% KM (t) UCL	0.0122
95% KM (% Bootstrap) UCL	N/A

**** Instead of UCL, EPC is selected to be median = <0.000186**
[per recommendation in ProUCL User Guide]

Butyl benzyl phthalate

Total Number of Data	38
Number of Non-Detect Data	36
Number of Detected Data	**2**
Minimum Detected	0.054
Maximum Detected	0.151
Percent Non-Detects	**94.74%**
Minimum Non-detect	0.00913

Maximum Non-detect	0.107

Mean of Detected Data	0.103
Median of Detected Data	0.103
Variance of Detected Data	0.0047
SD of Detected Data	0.0686
CV of Detected Data	0.669
Skewness of Detected Data	N/A
Mean of Detected log data	-2.405
SD of Detected Log data	0.727

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	37
Number treated as Detected	1
Single DL Percent Detection	97.37%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0566
SD	0.0155
Standard Error of Mean	0.00356
95% KM (t) UCL	0.0626
95% KM (z) UCL	0.0624
95% KM (BCA) UCL	0.151
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0721
97.5% KM (Chebyshev) UCL	0.0788
99% KM (Chebyshev) UCL	0.092

Potential UCL to Use

95% KM (t) UCL	0.0626
95% KM (% Bootstrap) UCL	N/A

** Instead of UCL, EPC is selected to be median = [per recommendation in ProUCL User Guide]	<0.0136

Cadmium

Total Number of Data	39
Number of Non-Detect Data	23
Number of Detected Data	**16**
Minimum Detected	0.28
Maximum Detected	0.94
Percent Non-Detects	**58.97%**
Minimum Non-detect	0.006
Maximum Non-detect	0.033
Mean of Detected Data	0.483
Median of Detected Data	0.43
Variance of Detected Data	0.0333
SD of Detected Data	0.183
CV of Detected Data	0.378
Skewness of Detected Data	1.401
Mean of Detected log data	-0.786
SD of Detected Log data	0.338

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.363
SD	0.151
Standard Error of Mean	0.0249
95% KM (t) UCL	0.405
95% KM (z) UCL	0.404
95% KM (BCA) UCL	0.444
95% KM (Percentile Bootstrap) UCL	0.424
95% KM (Chebyshev) UCL	0.472
97.5% KM (Chebyshev) UCL	**0.519**
99% KM (Chebyshev) UCL	0.611

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Carbazole

Total Number of Data	38
Number of Non-Detect Data	31
Number of Detected Data	**7**
Minimum Detected	0.0108
Maximum Detected	0.128
Percent Non-Detects	**81.58%**
Minimum Non-detect	0.00965
Maximum Non-detect	0.108
Mean of Detected Data	0.0465
Median of Detected Data	0.019
Variance of Detected Data	0.0025
SD of Detected Data	0.05
CV of Detected Data	1.075
Skewness of Detected Data	1.231
Mean of Detected log data	-3.532
SD of Detected Log data	1.001

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	36
Number treated as Detected	2
Single DL Percent Detection	94.74%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.0174
SD	0.0242
Standard Error of Mean	0.00425
95% KM (t) UCL	0.0246
95% KM (z) UCL	0.0244
95% KM (BCA) UCL	0.0314
95% KM (Percentile Bootstrap) UCL	0.0272
95% KM (Chebyshev) UCL	0.036
97.5% KM (Chebyshev) UCL	0.044
99% KM (Chebyshev) UCL	0.0597

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median = <0.0110**
[per recommendation in ProUCL User Guide]

Carbon disulfide

Total Number of Data	21
Number of Non-Detect Data	18
Number of Detected Data	**3**
Minimum Detected	0.00757
Maximum Detected	0.0284
Percent Non-Detects	**85.71%**
Minimum Non-detect	8.80E-05
Maximum Non-detect	0.127
Mean of Detected Data	0.0147
Median of Detected Data	0.00811
Variance of Detected Data	1.41E-04
SD of Detected Data	0.0119
CV of Detected Data	0.808
Skewness of Detected Data	1.728
Mean of Detected log data	-4.42
SD of Detected Log data	0.744

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	21
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.00864
SD	0.00454
Standard Error of Mean	0.00124
95% KM (t) UCL	0.0108
95% KM (z) UCL	0.0107
95% KM (BCA) UCL	0.0284
95% KM (Percentile Bootstrap) UCL	0.0284
95% KM (Chebyshev) UCL	0.0141

97.5% KM (Chebyshev) UCL	0.0164
99% KM (Chebyshev) UCL	0.021

Data appear Normal (0.05)
May want to try Normal UCLs

** Instead of UCL, EPC is selected to be median =	<0.000119
[per recommendation in ProUCL User Guide]	

Chromium

Number of Valid Observations	39
Number of Distinct Observations	36
Minimum	7.76
Maximum	128
Mean	18.31
Median	13.1
SD	19.72
Variance	388.8
Coefficient of Variation	1.077
Skewness	4.908
Mean of log data	2.705
SD of log data	0.522

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	23.64
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	26.16
95% Modified-t UCL	24.05
Non-Parametric UCLs	
95% CLT UCL	23.51
95% Jackknife UCL	23.64
95% Standard Bootstrap UCL	23.54
95% Bootstrap-t UCL	35.49
95% Hall's Bootstrap UCL	45.31
95% Percentile Bootstrap UCL	23.87
95% BCA Bootstrap UCL	27.9
95% Chebyshev(Mean, Sd) UCL	32.08
97.5% Chebyshev(Mean, Sd) UCL	38.03
99% Chebyshev(Mean, Sd) UCL	49.73

Potential UCL to Use	
Use 95% Chebyshev (Mean, Sd) UCL	**32.08**

Chrysene

Total Number of Data	38
Number of Non-Detect Data	26
Number of Detected Data	**12**
Minimum Detected	0.0104
Maximum Detected	1.3
Percent Non-Detects	**68.42%**
Minimum Non-detect	0.00816
Maximum Non-detect	0.0523
Mean of Detected Data	0.302
Median of Detected Data	0.122
Variance of Detected Data	0.181
SD of Detected Data	0.425
CV of Detected Data	1.408
Skewness of Detected Data	1.711
Mean of Detected log data	-2.204
SD of Detected Log data	1.606

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	29
Number treated as Detected	9
Single DL Percent Detection	76.32%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.103
SD	0.266
Standard Error of Mean	0.0451
95% KM (t) UCL	0.179
95% KM (z) UCL	0.177
95% KM (BCA) UCL	0.206
95% KM (Percentile Bootstrap) UCL	0.187
95% KM (Chebyshev) UCL	0.299
97.5% KM (Chebyshev) UCL	**0.384**
99% KM (Chebyshev) UCL	0.551

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

cis-1,2-Dichloroethene

Total Number of Data	21
Number of Non-Detect Data	19
Number of Detected Data	**2**
Minimum Detected	0.0195

Maximum Detected	0.999
Percent Non-Detects	**90.48%**
Minimum Non-detect	1.02E-04
Maximum Non-detect	0.147
Mean of Detected Data	0.509
Median of Detected Data	0.509
Variance of Detected Data	0.48
SD of Detected Data	0.693
CV of Detected Data	1.36
Skewness of Detected Data	N/A
Mean of Detected log data	-1.969
SD of Detected Log data	2.783

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	20
Number treated as Detected	1
Single DL Percent Detection	95.24%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0661
SD	0.209
Standard Error of Mean	0.0644
95% KM (t) UCL	0.177
95% KM (z) UCL	0.172
95% KM (BCA) UCL	0.999
95% KM (Percentile Bootstrap) UCL	0.999
95% KM (Chebyshev) UCL	0.347
97.5% KM (Chebyshev) UCL	0.468
99% KM (Chebyshev) UCL	0.707

Potential UCL to Use	
99% KM (Chebyshev) UCL	0.707

**** Instead of UCL, EPC is selected to be median = <0.000138**
[per recommendation in ProUCL User Guide]

Cobalt

Number of Valid Observations	39
Number of Distinct Observations	39
Minimum	2.81
Maximum	12
Mean	6.517
Median	6.14
SD	1.938
Variance	3.756
Coefficient of Variation	0.297
Skewness	0.492
Mean of log data	1.829
SD of log data	0.312

95% Useful UCLs	
Student's-t UCL	**7.04**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	7.053
95% Modified-t UCL	7.044
Non-Parametric UCLs	
95% CLT UCL	7.027
95% Jackknife UCL	7.04
95% Standard Bootstrap UCL	7.019
95% Bootstrap-t UCL	7.096
95% Hall's Bootstrap UCL	7.063
95% Percentile Bootstrap UCL	7.051
95% BCA Bootstrap UCL	7.051
95% Chebyshev(Mean, Sd) UCL	7.869
97.5% Chebyshev(Mean, Sd) UCL	8.455
99% Chebyshev(Mean, Sd) UCL	9.605

Data appear Normal (0.05)
May want to try Normal UCLs

Copper

Number of Valid Observations	39
Number of Distinct Observations	37
Minimum	4.59
Maximum	1760
Mean	65.61

Median	11.9
SD	280.4
Variance	78619
Coefficient of Variation	4.273
Skewness	6.117
Mean of log data	2.754
SD of log data	1.077

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	141.3
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	186.5
95% Modified-t UCL	148.6
Non-Parametric UCLs	
95% CLT UCL	139.5
95% Jackknife UCL	141.3
95% Standard Bootstrap UCL	136.1
95% Bootstrap-t UCL	1052
95% Hall's Bootstrap UCL	612.4
95% Percentile Bootstrap UCL	153.8
95% BCA Bootstrap UCL	243.2
95% Chebyshev(Mean, Sd) UCL	261.3
97.5% Chebyshev(Mean, Sd) UCL	346
99% Chebyshev(Mean, Sd) UCL	512.3

Potential UCL to Use	
99% Chebyshev(Mean, Sd) UCL	**512.3**

Cyclohexane

Total Number of Data	21
Number of Non-Detect Data	16
Number of Detected Data	**5**
Minimum Detected	0.000981
Maximum Detected	0.00185
Percent Non-Detects	**76.19%**
Minimum Non-detect	9.62E-04
Maximum Non-detect	1.29
Mean of Detected Data	0.00141
Median of Detected Data	0.00145
Variance of Detected Data	1.05E-07
SD of Detected Data	3.25E-04
CV of Detected Data	0.23
Skewness of Detected Data	-0.0112
Mean of Detected log data	-6.583
SD of Detected Log data	0.238

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	21
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00113
SD	2.64E-04
Standard Error of Mean	7.65E-05
95% KM (t) UCL	0.00126
95% KM (z) UCL	0.00125
95% KM (BCA) UCL	0.00156
95% KM (Percentile Bootstrap) UCL	0.00152
95% KM (Chebyshev) UCL	0.00146
97.5% KM (Chebyshev) UCL	0.0016
99% KM (Chebyshev) UCL	0.00189

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.00125**
[per recommendation in ProUCL User Guide]

Di-Benzo(g,h,i)perylene

Total Number of Data	1

Insufficent Number of Observations to produce Meaningful Statistics.

Dibenz(a,h)anthracene

Total Number of Data	38
Number of Non-Detect Data	31
Number of Detected Data	**7**
Minimum Detected	0.045
Maximum Detected	0.404
Percent Non-Detects	**81.58%**
Minimum Non-detect	0.00687

Maximum Non-detect	0.077
Mean of Detected Data	0.174
Median of Detected Data	0.166
Variance of Detected Data	0.0138
SD of Detected Data	0.117
CV of Detected Data	0.676
Skewness of Detected Data	1.29
Mean of Detected log data	-1.955
SD of Detected Log data	0.723

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	33
Number treated as Detected	5
Single DL Percent Detection	86.84%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.0688
SD	0.0684
Standard Error of Mean	0.012
95% KM (t) UCL	0.089
95% KM (z) UCL	0.0885
95% KM (BCA) UCL	0.181
95% KM (Percentile Bootstrap) UCL	0.163
95% KM (Chebyshev) UCL	0.121
97.5% KM (Chebyshev) UCL	0.144
99% KM (Chebyshev) UCL	0.188

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0108**
[per recommendation in ProUCL User Guide]

Dibenzofuran

Total Number of Data	38
Number of Non-Detect Data	34
Number of Detected Data	**4**

Minimum Detected	0.01
Maximum Detected	0.291
Percent Non-Detects	**89.47%**
Minimum Non-detect	0.00606
Maximum Non-detect	0.083
Mean of Detected Data	0.101
Median of Detected Data	0.0506
Variance of Detected Data	0.0173
SD of Detected Data	0.132
CV of Detected Data	1.309
Skewness of Detected Data	1.618
Mean of Detected log data	-3.123
SD of Detected Log data	1.568

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	36
Number treated as Detected	2
Single DL Percent Detection	94.74%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0196
SD	0.0462
Standard Error of Mean	0.00867
95% KM (t) UCL	0.0343
95% KM (z) UCL	0.0339
95% KM (BCA) UCL	0.291
95% KM (Percentile Bootstrap) UCL	0.102
95% KM (Chebyshev) UCL	0.0574
97.5% KM (Chebyshev) UCL	0.0738
99% KM (Chebyshev) UCL	0.106

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0150**
[per recommendation in ProUCL User Guide]

Dieldrin

Total Number of Data	38
Number of Non-Detect Data	37
Number of Detected Data	**1**
Minimum Detected	0.00545
Maximum Detected	0.00545
Percent Non-Detects	**97.37%**
Minimum Non-detect	0.000163
Maximum Non-detect	0.053

Data set has all detected values equal to = 0.00545, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00545

**** Instead of UCL, EPC is selected to be median = <0.000184**
[per recommendation in ProUCL User Guide]

Diethyl phthalate

Total Number of Data	38
Number of Non-Detect Data	36
Number of Detected Data	**2**
Minimum Detected	0.00992
Maximum Detected	0.011
Percent Non-Detects	**94.74%**
Minimum Non-detect	0.00756
Maximum Non-detect	0.0996
Mean of Detected Data	0.0105
Median of Detected Data	0.0105
Variance of Detected Data	5.83E-07
SD of Detected Data	7.64E-04
CV of Detected Data	0.073
Skewness of Detected Data	N/A
Mean of Detected log data	-4.562
SD of Detected Log data	0.0731

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	38
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0101
SD	3.57E-04
Standard Error of Mean	1.79E-04
95% KM (t) UCL	0.0104
95% KM (z) UCL	0.0103
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0108
97.5% KM (Chebyshev) UCL	0.0112
99% KM (Chebyshev) UCL	0.0118
Potential UCL to Use	
95% KM (t) UCL	0.0104
95% KM (% Bootstrap) UCL	N/A

**** Instead of UCL, EPC is selected to be median = <0.0185**
[per recommendation in ProUCL User Guide]

Di-n-butyl phthalate

Total Number of Data	38
Number of Non-Detect Data	36
Number of Detected Data	**2**
Minimum Detected	0.01
Maximum Detected	0.015
Percent Non-Detects	**94.74%**
Minimum Non-detect	0.00797
Maximum Non-detect	0.167
Mean of Detected Data	0.0125
Median of Detected Data	0.0125
Variance of Detected Data	1.25E-05
SD of Detected Data	0.00354
CV of Detected Data	0.283
Skewness of Detected Data	N/A
Mean of Detected log data	-4.402
SD of Detected Log data	0.287

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	38
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0105
SD	0.0015
Standard Error of Mean	6.71E-04
95% KM (t) UCL	0.0116
95% KM (z) UCL	0.0116
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.015
95% KM (Chebyshev) UCL	0.0134
97.5% KM (Chebyshev) UCL	0.0147
99% KM (Chebyshev) UCL	0.0172

Potential UCL to Use

95% KM (t) UCL	0.0116
95% KM (% Bootstrap) UCL	0.015

**** Instead of UCL, EPC is selected to be median = <0.0307**
[per recommendation in ProUCL User Guide]

Di-n-octyl phthalate

Total Number of Data	38
Number of Non-Detect Data	35
Number of Detected Data	**3**

Minimum Detected	0.0154
Maximum Detected	0.123
Percent Non-Detects	**92.11%**
Minimum Non-detect	0.00834
Maximum Non-detect	0.254

Mean of Detected Data	0.0601
Median of Detected Data	0.042
Variance of Detected Data	0.00314
SD of Detected Data	0.056
CV of Detected Data	0.932
Skewness of Detected Data	1.304
Mean of Detected log data	-3.146
SD of Detected Log data	1.039

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	38
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.019
SD	0.0179
Standard Error of Mean	0.0036
95% KM (t) UCL	0.0251
95% KM (z) UCL	0.025
95% KM (BCA) UCL	0.123
95% KM (Percentile Bootstrap) UCL	0.123
95% KM (Chebyshev) UCL	0.0347
97.5% KM (Chebyshev) UCL	0.0415
99% KM (Chebyshev) UCL	0.0549

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.00952**

[per recommendation in ProUCL User Guide]

Endrin

Total Number of Data	38
Number of Non-Detect Data	37
Number of Detected Data	**1**
Minimum Detected	0.00149
Maximum Detected	0.00149
Percent Non-Detects	**97.37%**
Minimum Non-detect	0.000198
Maximum Non-detect	0.063

Data set has all detected values equal to = 0.00149, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00149

**** Instead of UCL, EPC is selected to be median = <0.000224**
[per recommendation in ProUCL User Guide]

Endrin ketone

Total Number of Data	38
Number of Non-Detect Data	37
Number of Detected Data	**1**
Minimum Detected	0.00966
Maximum Detected	0.00966
Percent Non-Detects	**97.37%**
Minimum Non-detect	0.00049
Maximum Non-detect	0.064

Data set has all detected values equal to = 0.00966, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00966

**** Instead of UCL, EPC is selected to be median = <0.000552**
[per recommendation in ProUCL User Guide]

Ethylbenzene

Total Number of Data	21
Number of Non-Detect Data	15
Number of Detected Data	**6**
Minimum Detected	0.00114
Maximum Detected	0.023
Percent Non-Detects	**71.43%**
Minimum Non-detect	1.74E-04

Maximum Non-detect	0.242
Mean of Detected Data	0.00598
Median of Detected Data	0.00244
Variance of Detected Data	7.13E-05
SD of Detected Data	0.00844
CV of Detected Data	1.413
Skewness of Detected Data	2.323
Mean of Detected log data	-5.697
SD of Detected Log data	1.059

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	21
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00269
SD	0.00476
Standard Error of Mean	0.00117
95% KM (t) UCL	0.00471
95% KM (z) UCL	0.00462
95% KM (BCA) UCL	0.00584
95% KM (Percentile Bootstrap) UCL	0.00502
95% KM (Chebyshev) UCL	0.0078
97.5% KM (Chebyshev) UCL	0.01
99% KM (Chebyshev) UCL	0.0144

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median = <0.00114**
[per recommendation in ProUCL User Guide]

Fluoranthene

Total Number of Data	38
Number of Non-Detect Data	28
Number of Detected Data	**10**

Minimum Detected	0.014
Maximum Detected	2.19
Percent Non-Detects	**73.68%**
Minimum Non-detect	0.00676
Maximum Non-detect	0.075
Mean of Detected Data	0.508
Median of Detected Data	0.146
Variance of Detected Data	0.652
SD of Detected Data	0.808
CV of Detected Data	1.591
Skewness of Detected Data	1.754
Mean of Detected log data	-1.863
SD of Detected Log data	1.68

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs

Number treated as Non-Detect	32
Number treated as Detected	6
Single DL Percent Detection	84.21%

Data Dsitribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.144
SD	0.449
Standard Error of Mean	0.0768
95% KM (t) UCL	0.274
95% KM (z) UCL	0.27
95% KM (BCA) UCL	0.318
95% KM (Percentile Bootstrap) UCL	0.286
95% KM (Chebyshev) UCL	0.479
97.5% KM (Chebyshev) UCL	**0.624**
99% KM (Chebyshev) UCL	0.908

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Fluorene

Total Number of Data	38
Number of Non-Detect Data	32
Number of Detected Data	**6**
Minimum Detected	0.017
Maximum Detected	1.21
Percent Non-Detects	**84.21%**
Minimum Non-detect	0.00687

Maximum Non-detect	0.0575

Mean of Detected Data	0.243
Median of Detected Data	0.032
Variance of Detected Data	0.227
SD of Detected Data	0.476
CV of Detected Data	1.959
Skewness of Detected Data	2.4
Mean of Detected log data	-2.732
SD of Detected Log data	1.603

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	36
Number treated as Detected	2
Single DL Percent Detection	94.74%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0527
SD	0.191
Standard Error of Mean	0.034
95% KM (t) UCL	0.11
95% KM (z) UCL	0.109
95% KM (BCA) UCL	0.169
95% KM (Percentile Bootstrap) UCL	0.121
95% KM (Chebyshev) UCL	0.201
97.5% KM (Chebyshev) UCL	0.265
99% KM (Chebyshev) UCL	0.391

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

**** Instead of UCL, EPC is selected to be median = <0.000392**
[per recommendation in ProUCL User Guide]

Indeno(1,2,3-cd)pyrene

Total Number of Data	38
Number of Non-Detect Data	25
Number of Detected Data	**13**

Minimum Detected	0.02
Maximum Detected	1.51
Percent Non-Detects	**65.79%**
Minimum Non-detect	0.014
Maximum Non-detect	0.147
Mean of Detected Data	0.295
Median of Detected Data	0.149
Variance of Detected Data	0.172
SD of Detected Data	0.414
CV of Detected Data	1.403
Skewness of Detected Data	2.569
Mean of Detected log data	-1.812
SD of Detected Log data	1.079

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	31
Number treated as Detected	7
Single DL Percent Detection	81.58%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.115
SD	0.267
Standard Error of Mean	0.0451
95% KM (t) UCL	0.191
95% KM (z) UCL	0.189
95% KM (BCA) UCL	0.243
95% KM (Percentile Bootstrap) UCL	0.215
95% KM (Chebyshev) UCL	0.311
97.5% KM (Chebyshev) UCL	**0.396**
99% KM (Chebyshev) UCL	0.563

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Iron

Number of Valid Observations	39
Number of Distinct Observations	35
Minimum	7120
Maximum	128000
Mean	20887
Median	15700
SD	22929

Variance	5.26E+08
Coefficient of Variation	1.098
Skewness	4.023
Mean of log data	9.721
SD of log data	0.554

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	27077
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	29453
95% Modified-t UCL	27471
Non-Parametric UCLs	
95% CLT UCL	26926
95% Jackknife UCL	27077
95% Standard Bootstrap UCL	26865
95% Bootstrap-t UCL	46464
95% Hall's Bootstrap UCL	59416
95% Percentile Bootstrap UCL	27342
95% BCA Bootstrap UCL	30966
95% Chebyshev(Mean, Sd) UCL	36891
97.5% Chebyshev(Mean, Sd) UCL	43816
99% Chebyshev(Mean, Sd) UCL	57418

Potential UCL to Use	
Use 95% Chebyshev (Mean, Sd) UCL	**36891**

Lead

Number of Valid Observations	39
Number of Distinct Observations	34
Minimum	5.88
Maximum	630
Mean	52.97
Median	16.1
SD	122.7
Variance	15045
Coefficient of Variation	2.316
Skewness	3.977
Mean of log data	3.054
SD of log data	1.066

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	86.08
95% UCLs (Adjusted for Skewness)	

95% Adjusted-CLT UCL	98.64
95% Modified-t UCL	88.16

Non-Parametric UCLs	
95% CLT UCL	85.27
95% Jackknife UCL	86.08
95% Standard Bootstrap UCL	83.96
95% Bootstrap-t UCL	173.7
95% Hall's Bootstrap UCL	218.9
95% Percentile Bootstrap UCL	89.44
95% BCA Bootstrap UCL	100.6
95% Chebyshev(Mean, Sd) UCL	138.6
97.5% Chebyshev(Mean, Sd) UCL	175.6
99% Chebyshev(Mean, Sd) UCL	248.4

Potential UCL to Use	
99% Chebyshev(Mean, Sd) UCL	**248.4**

Lithium

Number of Valid Observations	39
Number of Distinct Observations	36
Minimum	2.59
Maximum	32.2
Mean	19.22
Median	19
SD	5.944
Variance	35.33
Coefficient of Variation	0.309
Skewness	-0.0688
Mean of log data	2.892
SD of log data	0.416

95% Useful UCLs	
Student's-t UCL	**20.83**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	20.78
95% Modified-t UCL	20.83

Non-Parametric UCLs	
95% CLT UCL	20.79
95% Jackknife UCL	20.83
95% Standard Bootstrap UCL	20.77
95% Bootstrap-t UCL	20.88
95% Hall's Bootstrap UCL	20.84
95% Percentile Bootstrap UCL	20.78
95% BCA Bootstrap UCL	20.84
95% Chebyshev(Mean, Sd) UCL	23.37
97.5% Chebyshev(Mean, Sd) UCL	25.17
99% Chebyshev(Mean, Sd) UCL	28.69

Data appear Normal (0.05)
May want to try Normal UCLs

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m,p-Xylene

Total Number of Data	21
Number of Non-Detect Data	19
Number of Detected Data	**2**
Minimum Detected	0.00132
Maximum Detected	0.00139
Percent Non-Detects	**90.48%**
Minimum Non-detect	3.21E-04
Maximum Non-detect	0.465
Mean of Detected Data	0.00136
Median of Detected Data	0.00136
Variance of Detected Data	2.45E-09
SD of Detected Data	4.95E-05
CV of Detected Data	0.0365
Skewness of Detected Data	N/A
Mean of Detected log data	-6.604
SD of Detected Log data	0.0365

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	21
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.00132
SD	1.75E-05
Standard Error of Mean	6.38E-06
95% KM (t) UCL	0.00134
95% KM (z) UCL	0.00134
95% KM (BCA) UCL	0.00139
95% KM (Percentile Bootstrap) UCL	0.00139
95% KM (Chebyshev) UCL	0.00135
97.5% KM (Chebyshev) UCL	0.00136
99% KM (Chebyshev) UCL	0.00139
Potential UCL to Use	
95% KM (t) UCL	0.00134
95% KM (% Bootstrap) UCL	0.00139

**** Instead of UCL, EPC is selected to be median = <0.000422**
[per recommendation in ProUCL User Guide]

Manganese

Number of Valid Observations	39
Number of Distinct Observations	39
Minimum	82.3
Maximum	1210
Mean	387
Median	300
SD	251.9
Variance	63467
Coefficient of Variation	0.651
Skewness	1.816
Mean of log data	5.785
SD of log data	0.594
95% Useful UCLs	
Student's-t UCL	455
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	465.9
95% Modified-t UCL	457
Non-Parametric UCLs	
95% CLT UCL	453.4
95% Jackknife UCL	455
95% Standard Bootstrap UCL	451.9
95% Bootstrap-t UCL	476.4
95% Hall's Bootstrap UCL	480.5
95% Percentile Bootstrap UCL	455
95% BCA Bootstrap UCL	472.4
95% Chebyshev(Mean, Sd) UCL	562.9
97.5% Chebyshev(Mean, Sd) UCL	**638.9**
99% Chebyshev(Mean, Sd) UCL	788.4

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Mercury

Total Number of Data	39
Number of Non-Detect Data	24
Number of Detected Data	**15**
Minimum Detected	0.0034
Maximum Detected	0.17
Percent Non-Detects	**61.54%**
Minimum Non-detect	0.0023
Maximum Non-detect	0.028
Mean of Detected Data	0.0301
Median of Detected Data	0.015
Variance of Detected Data	0.0018
SD of Detected Data	0.0424
CV of Detected Data	1.409
Skewness of Detected Data	2.922
Mean of Detected log data	-4.076
SD of Detected Log data	1.033

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	35
Number treated as Detected	4
Single DL Percent Detection	89.74%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0143
SD	0.0284
Standard Error of Mean	0.00472
95% KM (t) UCL	0.0223
95% KM (z) UCL	0.0221
95% KM (BCA) UCL	0.0253
95% KM (Percentile Bootstrap) UCL	0.0233
95% KM (Chebyshev) UCL	0.0349
97.5% KM (Chebyshev) UCL	**0.0438**
99% KM (Chebyshev) UCL	0.0613

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Methylcyclohexane

Total Number of Data	21
Number of Non-Detect Data	15
Number of Detected Data	**6**
Minimum Detected	0.0015
Maximum Detected	0.00278
Percent Non-Detects	**71.43%**
Minimum Non-detect	2.99E-04
Maximum Non-detect	0.432

Mean of Detected Data	0.00216
Median of Detected Data	0.0022
Variance of Detected Data	3.18E-07
SD of Detected Data	5.64E-04
CV of Detected Data	0.261
Skewness of Detected Data	-0.144
Mean of Detected log data	-6.167
SD of Detected Log data	0.273

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	21
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.00176
SD	4.59E-04
Standard Error of Mean	1.30E-04
95% KM (t) UCL	0.00199
95% KM (z) UCL	0.00198
95% KM (BCA) UCL	0.00242
95% KM (Percentile Bootstrap) UCL	0.00229
95% KM (Chebyshev) UCL	0.00233
97.5% KM (Chebyshev) UCL	0.00258
99% KM (Chebyshev) UCL	0.00306

Data appear Normal (0.05)
May want to try Normal UCLs

** Instead of UCL, EPC is selected to be median =	<0.00154
[per recommendation in ProUCL User Guide]	

Molybdenum

Total Number of Data	39
Number of Non-Detect Data	15
Number of Detected Data	**24**
Minimum Detected	0.085
Maximum Detected	10.7
Percent Non-Detects	**38.46%**
Minimum Non-detect	0.074
Maximum Non-detect	0.086
Mean of Detected Data	1.061
Median of Detected Data	0.375
Variance of Detected Data	4.919
SD of Detected Data	2.218
CV of Detected Data	2.09
Skewness of Detected Data	3.957
Mean of Detected log data	-0.858
SD of Detected Log data	1.218

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	16
Number treated as Detected	23
Single DL Percent Detection	41.03%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	41.03%
Mean	0.14
SD	0.0294
95% Winsor (t) UCL	0.149
Kaplan Meier (KM) Method	
Mean	0.686
SD	1.768
Standard Error of Mean	0.289
95% KM (t) UCL	1.174
95% KM (z) UCL	1.162
95% KM (BCA) UCL	1.257
95% KM (Percentile Bootstrap) UCL	1.236
95% KM (Chebyshev) UCL	1.947
97.5% KM (Chebyshev) UCL	**2.492**
99% KM (Chebyshev) UCL	3.564

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Naphthalene

Total Number of Data	21
Number of Non-Detect Data	14
Number of Detected Data	**7**
Minimum Detected	0.0013
Maximum Detected	67.8
Percent Non-Detects	**66.67%**
Minimum Non-detect	3.16E-04
Maximum Non-detect	0.502
Mean of Detected Data	9.709
Median of Detected Data	0.00374
Variance of Detected Data	656.2
SD of Detected Data	25.62
CV of Detected Data	2.638
Skewness of Detected Data	2.646
Mean of Detected log data	-3.897
SD of Detected Log data	3.916

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	20
Number treated as Detected	1
Single DL Percent Detection	95.24%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	3.238
SD	14.44
Standard Error of Mean	3.403
95% KM (t) UCL	9.107
95% KM (z) UCL	8.835
95% KM (BCA) UCL	9.696
95% KM (Percentile Bootstrap) UCL	9.694
95% KM (Chebyshev) UCL	18.07
97.5% KM (Chebyshev) UCL	24.49
99% KM (Chebyshev) UCL	37.09

Potential UCL to Use	
99% KM (Chebyshev) UCL	37.09

**** Instead of UCL, EPC is selected to be median = <0.00370**
[per recommendation in ProUCL User Guide]

Nickel

Number of Valid Observations	39
Number of Distinct Observations	35
Minimum	9.74
Maximum	51.7
Mean	17.98
Median	16.4
SD	7.815
Variance	61.08
Coefficient of Variation	0.435
Skewness	3.129
Mean of log data	2.829
SD of log data	0.321

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	20.09
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	20.71
95% Modified-t UCL	20.19
Non-Parametric UCLs	
95% CLT UCL	20.04
95% Jackknife UCL	20.09
95% Standard Bootstrap UCL	20.02
95% Bootstrap-t UCL	22.36
95% Hall's Bootstrap UCL	31.93
95% Percentile Bootstrap UCL	20.09
95% BCA Bootstrap UCL	20.82
95% Chebyshev(Mean, Sd) UCL	23.43
97.5% Chebyshev(Mean, Sd) UCL	25.79
99% Chebyshev(Mean, Sd) UCL	30.43
Potential UCL to Use	
Use 95% Student's-t UCL	20.09
Or 95% Modified-t UCL	**20.19**

Phenanthrene

Total Number of Data	38

Number of Non-Detect Data	26
Number of Detected Data	**12**
Minimum Detected	0.018
Maximum Detected	1.83
Percent Non-Detects	**68.42%**
Minimum Non-detect	0.00729
Maximum Non-detect	0.0727

Mean of Detected Data	0.437
Median of Detected Data	0.107
Variance of Detected Data	0.413
SD of Detected Data	0.642
CV of Detected Data	1.471
Skewness of Detected Data	1.452
Mean of Detected log data	-2.039
SD of Detected Log data	1.689

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	32
Number treated as Detected	6
Single DL Percent Detection	84.21%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.15
SD	0.397
Standard Error of Mean	0.0672
95% KM (t) UCL	0.264
95% KM (z) UCL	0.261
95% KM (BCA) UCL	0.284
95% KM (Percentile Bootstrap) UCL	0.27
95% KM (Chebyshev) UCL	0.443
97.5% KM (Chebyshev) UCL	**0.57**
99% KM (Chebyshev) UCL	0.819

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Pyrene

Total Number of Data	39
Number of Non-Detect Data	25
Number of Detected Data	**14**
Minimum Detected	0.0149
Maximum Detected	4.64

Percent Non-Detects	**64.10%**
Minimum Non-detect	0.00882
Maximum Non-detect	0.0702

Mean of Detected Data	0.704
Median of Detected Data	0.16
Variance of Detected Data	1.713
SD of Detected Data	1.309
CV of Detected Data	1.859
Skewness of Detected Data	2.492
Mean of Detected log data	-1.838
SD of Detected Log data	1.841

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	29
Number treated as Detected	10
Single DL Percent Detection	74.36%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.262
SD	0.825
Standard Error of Mean	0.137
95% KM (t) UCL	0.493
95% KM (z) UCL	0.488
95% KM (BCA) UCL	0.521
95% KM (Percentile Bootstrap) UCL	0.492
95% KM (Chebyshev) UCL	0.86
97.5% KM (Chebyshev) UCL	**1.118**
99% KM (Chebyshev) UCL	1.626

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Silver

Total Number of Data	39
Number of Non-Detect Data	36
Number of Detected Data	**3**
Minimum Detected	0.092
Maximum Detected	0.41
Percent Non-Detects	**92.31%**
Minimum Non-detect	0.027
Maximum Non-detect	0.15

Mean of Detected Data	0.264
Median of Detected Data	0.29
Variance of Detected Data	0.0258
SD of Detected Data	0.161
CV of Detected Data	0.608
Skewness of Detected Data	-0.709
Mean of Detected log data	-1.505
SD of Detected Log data	0.782

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	37
Number treated as Detected	2
Single DL Percent Detection	94.87%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.105
SD	0.0585
Standard Error of Mean	0.0115
95% KM (t) UCL	0.125
95% KM (z) UCL	0.124
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.41
95% KM (Chebyshev) UCL	0.155
97.5% KM (Chebyshev) UCL	0.177
99% KM (Chebyshev) UCL	0.219

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0590**
[per recommendation in ProUCL User Guide]

Strontium

Number of Valid Observations	39

Number of Distinct Observations	38
Minimum	22.1
Maximum	96.2
Mean	56.35
Median	53.4
SD	20.89
Variance	436.3
Coefficient of Variation	0.371
Skewness	0.0857
Mean of log data	3.955
SD of log data	0.412

95% Useful UCLs	
Student's-t UCL	**61.99**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	61.9
95% Modified-t UCL	61.99
Non-Parametric UCLs	
95% CLT UCL	61.85
95% Jackknife UCL	61.99
95% Standard Bootstrap UCL	61.62
95% Bootstrap-t UCL	62.37
95% Hall's Bootstrap UCL	61.9
95% Percentile Bootstrap UCL	61.86
95% BCA Bootstrap UCL	61.78
95% Chebyshev(Mean, Sd) UCL	70.93
97.5% Chebyshev(Mean, Sd) UCL	77.23
99% Chebyshev(Mean, Sd) UCL	89.63

Data appear Normal (0.05)
May want to try Normal UCLs

Tetrachloroethene

Total Number of Data	21
Number of Non-Detect Data	18
Number of Detected Data	**3**
Minimum Detected	0.00135
Maximum Detected	0.223
Percent Non-Detects	**85.71%**
Minimum Non-detect	1.55E-04
Maximum Non-detect	0.224
Mean of Detected Data	0.076
Median of Detected Data	0.00362
Variance of Detected Data	0.0162
SD of Detected Data	0.127
CV of Detected Data	1.675
Skewness of Detected Data	1.731

Mean of Detected log data	-4.577
SD of Detected Log data	2.709

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	21
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0126
SD	0.0483
Standard Error of Mean	0.0132
95% KM (t) UCL	0.0354
95% KM (z) UCL	0.0343
95% KM (BCA) UCL	0.223
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0702
97.5% KM (Chebyshev) UCL	0.0951
99% KM (Chebyshev) UCL	0.144

May want to try Lognormal UCLs

**** Instead of UCL, EPC is selected to be median = <0.000211**
[per recommendation in ProUCL User Guide]

Thallium

Total Number of Data	39
Number of Non-Detect Data	38
Number of Detected Data	**1**
Minimum Detected	0.63
Maximum Detected	0.63
Percent Non-Detects	**97.37%**
Minimum Non-detect	0.09

Maximum Non-detect	0.89

Data set has all detected values equal to = 0.63, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.63

**** Instead of UCL, EPC is selected to be median = <0.100**
[per recommendation in ProUCL User Guide]

Tin

Total Number of Data	39
Number of Non-Detect Data	33
Number of Detected Data	**6**
Minimum Detected	0.68
Maximum Detected	178
Percent Non-Detects	**84.62%**
Minimum Non-detect	0.39
Maximum Non-detect	2.17

Mean of Detected Data	30.97
Median of Detected Data	1.385
Variance of Detected Data	5189
SD of Detected Data	72.04
CV of Detected Data	2.326
Skewness of Detected Data	2.448
Mean of Detected log data	1.065
SD of Detected Log data	2.109

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	37
Number treated as Detected	2
Single DL Percent Detection	94.87%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	5.342
SD	28.01
Standard Error of Mean	4.914

95% KM (t) UCL	13.63
95% KM (z) UCL	13.42
95% KM (BCA) UCL	14.63
95% KM (Percentile Bootstrap) UCL	14.44
95% KM (Chebyshev) UCL	26.76
97.5% KM (Chebyshev) UCL	36.03
99% KM (Chebyshev) UCL	54.23

Potential UCL to Use

99% KM (Chebyshev) UCL	54.23

**** Instead of UCL, EPC is selected to be median = <0.57**
[per recommendation in ProUCL User Guide]

Titanium

Number of Valid Observations	39
Number of Distinct Observations	36
Minimum	3.41
Maximum	87.4
Mean	23.33
Median	18.9
SD	17
Variance	289
Coefficient of Variation	0.729
Skewness	1.934
Mean of log data	2.928
SD of log data	0.688

95% Useful UCLs

Student's-t UCL	27.92

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	28.71
95% Modified-t UCL	28.06

Non-Parametric UCLs

95% CLT UCL	27.81
95% Jackknife UCL	27.92
95% Standard Bootstrap UCL	27.67
95% Bootstrap-t UCL	29.04
95% Hall's Bootstrap UCL	29.8
95% Percentile Bootstrap UCL	28
95% BCA Bootstrap UCL	28.5
95% Chebyshev(Mean, Sd) UCL	35.2
97.5% Chebyshev(Mean, Sd) UCL	**40.33**
99% Chebyshev(Mean, Sd) UCL	50.42

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Toluene

Total Number of Data	21
Number of Non-Detect Data	13
Number of Detected Data	**8**
Minimum Detected	0.00134
Maximum Detected	0.0122
Percent Non-Detects	**61.90%**
Minimum Non-detect	4.78E-04
Maximum Non-detect	0.642
Mean of Detected Data	0.00491
Median of Detected Data	0.00445
Variance of Detected Data	1.06E-05
SD of Detected Data	0.00325
CV of Detected Data	0.662
Skewness of Detected Data	1.816
Mean of Detected log data	-5.488
SD of Detected Log data	0.635

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	21
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.00324
SD	0.00285
Standard Error of Mean	7.86E-04
95% KM (t) UCL	0.0046
95% KM (z) UCL	0.00454
95% KM (BCA) UCL	0.00561
95% KM (Percentile Bootstrap) UCL	0.00515
95% KM (Chebyshev) UCL	0.00667
97.5% KM (Chebyshev) UCL	**0.00815**
99% KM (Chebyshev) UCL	0.0111

Data appear Normal (0.05)
May want to try Normal UCLs

Vanadium

Number of Valid Observations	39
Number of Distinct Observations	35
Minimum	7.85
Maximum	45.8
Mean	21.04
Median	20.2
SD	8.325
Variance	69.31
Coefficient of Variation	0.396
Skewness	0.511
Mean of log data	2.963
SD of log data	0.429

95% Useful UCLs	
Student's-t UCL	**23.29**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	23.35
95% Modified-t UCL	23.31
Non-Parametric UCLs	
95% CLT UCL	23.23
95% Jackknife UCL	23.29
95% Standard Bootstrap UCL	23.19
95% Bootstrap-t UCL	23.43
95% Hall's Bootstrap UCL	23.54
95% Percentile Bootstrap UCL	23.34
95% BCA Bootstrap UCL	23.3
95% Chebyshev(Mean, Sd) UCL	26.85
97.5% Chebyshev(Mean, Sd) UCL	29.36
99% Chebyshev(Mean, Sd) UCL	34.3

Data appear Normal (0.05)
May want to try Normal UCLs

Xylene (total)

Total Number of Data	21
Number of Non-Detect Data	12
Number of Detected Data	**9**
Minimum Detected	0.00139
Maximum Detected	1.76
Percent Non-Detects	**57.14%**
Minimum Non-detect	4.62E-04
Maximum Non-detect	0.668
Mean of Detected Data	0.41

Median of Detected Data	0.069
Variance of Detected Data	0.475
SD of Detected Data	0.689
CV of Detected Data	1.682
Skewness of Detected Data	1.647
Mean of Detected log data	-2.638
SD of Detected Log data	2.381

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	19
Number treated as Detected	2
Single DL Percent Detection	90.48%

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.178
SD	0.47
Standard Error of Mean	0.109
95% KM (t) UCL	0.365
95% KM (z) UCL	0.357
95% KM (BCA) UCL	0.406
95% KM (Percentile Bootstrap) UCL	0.372
95% KM (Chebyshev) UCL	0.652
97.5% KM (Chebyshev) UCL	**0.858**
99% KM (Chebyshev) UCL	1.261

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Zinc

Number of Valid Observations	39
Number of Distinct Observations	39
Minimum	21.1
Maximum	5640
Mean	282.5
Median	56.7
SD	939.6
Variance	882844
Coefficient of Variation	3.326

Skewness	5.321
Mean of log data	4.392
SD of log data	1.135

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	536.1
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	666.9
95% Modified-t UCL	557.5
Non-Parametric UCLs	
95% CLT UCL	530
95% Jackknife UCL	536.1
95% Standard Bootstrap UCL	532.5
95% Bootstrap-t UCL	2465
95% Hall's Bootstrap UCL	1561
95% Percentile Bootstrap UCL	560.5
95% BCA Bootstrap UCL	721
95% Chebyshev(Mean, Sd) UCL	938.3
97.5% Chebyshev(Mean, Sd) UCL	1222
99% Chebyshev(Mean, Sd) UCL	1779

Potential UCL to Use	
99% Chebyshev(Mean, Sd) UCL	**1779**

APPENDIX A-5

BACKGROUND SOIL

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	C:\Users\Michael\ . . . . \ProUCL data analysis\BACKGROUND AREA SOIL\BACKGROUND AREA SOIL_ProUCL input.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony

Total Number of Data	10
Number of Non-Detect Data	5
Number of Detected Data	**5**
Minimum Detected	1.48
Maximum Detected	2.19
Percent Non-Detects	**50.00%**
Minimum Non-detect	0.25
Maximum Non-detect	0.3
Mean of Detected Data	1.768
Median of Detected Data	1.69
Variance of Detected Data	0.0732
SD of Detected Data	0.271
CV of Detected Data	0.153
Skewness of Detected Data	1.024
Mean of Detected log data	0.561
SD of Detected Log data	0.148

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	1.624
SD	0.224
Standard Error of Mean	0.0791
95% KM (t) UCL	1.769
95% KM (z) UCL	1.754
95% KM (BCA) UCL	1.89
95% KM (Percentile Bootstrap) UCL	1.815
95% KM (Chebyshev) UCL	1.969
97.5% KM (Chebyshev) UCL	2.118

99% KM (Chebyshev) UCL	2.411

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median =**	**<0.890**
[per recommendation in ProUCL User Guide]	

Arsenic

Total Number of Data	10
Number of Non-Detect Data	1
Number of Detected Data	**9**
Minimum Detected	1.69
Maximum Detected	5.9
Percent Non-Detects	**10.00%**
Minimum Non-detect	0.24
Maximum Non-detect	0.24

Mean of Detected Data	3.793
Median of Detected Data	3.72
Variance of Detected Data	2.191
SD of Detected Data	1.48
CV of Detected Data	0.39
Skewness of Detected Data	-0.0437
Mean of Detected log data	1.253
SD of Detected Log data	0.448

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	0.448
Mean	3.566
SD	1.518
95% Winsor (t) UCL	**4.476**

Kaplan Meier (KM) Method	
Mean	3.583
SD	1.467
Standard Error of Mean	0.492
95% KM (t) UCL	4.485
95% KM (z) UCL	4.392
95% KM (BCA) UCL	4.441
95% KM (Percentile Bootstrap) UCL	4.423
95% KM (Chebyshev) UCL	5.727
97.5% KM (Chebyshev) UCL	6.655

99% KM (Chebyshev) UCL	8.477

Data appear Normal (0.05)
May want to try Normal UCLs

Barium

Number of Valid Observations	10
Number of Distinct Observations	8
Minimum	150
Maximum	1130
Mean	333.1
Median	259
SD	288.1
Variance	82980
Coefficient of Variation	0.865
Skewness	2.844
Mean of log data	5.617
SD of log data	0.571
95% Useful UCLs	
Student's-t UCL	500.1
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	570.5
95% Modified-t UCL	513.7
Non-Parametric UCLs	
95% CLT UCL	482.9
95% Jackknife UCL	500.1
95% Standard Bootstrap UCL	476.8
95% Bootstrap-t UCL	864.1
95% Hall's Bootstrap UCL	1100
95% Percentile Bootstrap UCL	497.6
95% BCA Bootstrap UCL	584.8
95% Chebyshev(Mean, Sd) UCL	730.2
97.5% Chebyshev(Mean, Sd) UCL	**902**
99% Chebyshev(Mean, Sd) UCL	1239

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Benzo(a)anthracene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.082
Maximum Detected	0.082
Percent Non-Detects	**90.00%**

Minimum Non-detect	0.00646
Maximum Non-detect	0.00908

Data set has all detected values equal to = 0.082, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.082

**** Instead of UCL, EPC is selected to be median = <0.00761**
[per recommendation in ProUCL User Guide]

Benzo(a)pyrene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.076
Maximum Detected	0.076
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.00868
Maximum Non-detect	0.012

Data set has all detected values equal to = 0.076, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.076

**** Instead of UCL, EPC is selected to be median = <0.0100**
[per recommendation in ProUCL User Guide]

Benzo(b)fluoranthene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.057
Maximum Detected	0.057
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.00698
Maximum Non-detect	0.00981

Data set has all detected values equal to = 0.057, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.057

**** Instead of UCL, EPC is selected to be median = <0.00822**
[per recommendation in ProUCL User Guide]

Benzo(g,h,i)perylene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.083
Maximum Detected	0.083
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.03
Maximum Non-detect	0.042

Data set has all detected values equal to = 0.083, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.083

**** Instead of UCL, EPC is selected to be median = <0.035**
[per recommendation in ProUCL User Guide]

Benzo(k)fluoranthene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.106
Maximum Detected	0.106
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.00985
Maximum Non-detect	0.014

Data set has all detected values equal to = 0.106, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.106

**** Instead of UCL, EPC is selected to be median = <0.0115**
[per recommendation in ProUCL User Guide]

Cadmium

Total Number of Data	10
Number of Non-Detect Data	7
Number of Detected Data	**3**
Minimum Detected	0.041
Maximum Detected	0.11
Percent Non-Detects	**70.00%**
Minimum Non-detect	0.015
Maximum Non-detect	0.02

Mean of Detected Data	0.083

Median of Detected Data	0.098
Variance of Detected Data	0.00136
SD of Detected Data	0.0369
CV of Detected Data	0.444
Skewness of Detected Data	-1.528
Mean of Detected log data	-2.575
SD of Detected Log data	0.54

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0536
SD	0.0253
Standard Error of Mean	0.00982
95% KM (t) UCL	0.0716
95% KM (z) UCL	0.0697
95% KM (BCA) UCL	0.11
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0964
97.5% KM (Chebyshev) UCL	0.115
99% KM (Chebyshev) UCL	0.151

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.019**
[per recommendation in ProUCL User Guide]

Carbazole

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.011
Maximum Detected	0.011
Percent Non-Detects	**90.00%**

Minimum Non-detect	0.00752
Maximum Non-detect	0.011

Data set has all detected values equal to = 0.011, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.011

**** Instead of UCL, EPC is selected to be median = <0.00886**
[per recommendation in ProUCL User Guide]

Chromium

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	10.7
Maximum	20.1
Mean	15.2
Median	14.15
SD	3.02
Variance	9.12
Coefficient of Variation	0.199
Skewness	0.27
Mean of log data	2.703
SD of log data	0.199

95% Useful UCLs	
Student's-t UCL	**16.95**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	16.86
95% Modified-t UCL	16.96
Non-Parametric UCLs	
95% CLT UCL	16.77
95% Jackknife UCL	16.95
95% Standard Bootstrap UCL	16.68
95% Bootstrap-t UCL	17.21
95% Hall's Bootstrap UCL	16.78
95% Percentile Bootstrap UCL	16.65
95% BCA Bootstrap UCL	16.72
95% Chebyshev(Mean, Sd) UCL	19.36
97.5% Chebyshev(Mean, Sd) UCL	21.16
99% Chebyshev(Mean, Sd) UCL	24.7

Data appear Normal (0.05)
May want to try Normal UCLs

Chrysene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.083
Maximum Detected	0.083
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.012
Maximum Non-detect	0.016

Data set has all detected values equal to = 0.083, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.083

**** Instead of UCL, EPC is selected to be median = <0.014**
[per recommendation in ProUCL User Guide]

Copper

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	7.68
Maximum	19.3
Mean	12.12
Median	10.8
SD	3.955
Variance	15.64
Coefficient of Variation	0.326
Skewness	0.802
Mean of log data	2.449
SD of log data	0.313
95% Useful UCLs	
Student's-t UCL	**14.41**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	14.51
95% Modified-t UCL	14.46
Non-Parametric UCLs	
95% CLT UCL	14.17
95% Jackknife UCL	14.41
95% Standard Bootstrap UCL	14.1
95% Bootstrap-t UCL	15.2
95% Hall's Bootstrap UCL	14.64
95% Percentile Bootstrap UCL	14.27
95% BCA Bootstrap UCL	14.33
95% Chebyshev(Mean, Sd) UCL	17.57
97.5% Chebyshev(Mean, Sd) UCL	19.93
99% Chebyshev(Mean, Sd) UCL	24.56

Data appear Normal (0.05)
May want to try Normal UCLs

Fluoranthene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.156
Maximum Detected	0.156
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.00971
Maximum Non-detect	0.014

Data set has all detected values equal to = 0.156, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.156

**** Instead of UCL, EPC is selected to be median = <0.0115**
[per recommendation in ProUCL User Guide]

Indeno(1,2,3-cd)pyrene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.417
Maximum Detected	0.417
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.025
Maximum Non-detect	0.035

Data set has all detected values equal to = 0.417, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.417

**** Instead of UCL, EPC is selected to be median = <0.0295**
[per recommendation in ProUCL User Guide]

Lead

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	11
Maximum	15.2
Mean	13.43
Median	13.35

SD	1.547
Variance	2.393
Coefficient of Variation	0.115
Skewness	-0.326
Mean of log data	2.591
SD of log data	0.118

95% Useful UCLs	
Student's-t UCL	**14.33**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	14.18
95% Modified-t UCL	14.32

Non-Parametric UCLs	
95% CLT UCL	14.23
95% Jackknife UCL	14.33
95% Standard Bootstrap UCL	14.18
95% Bootstrap-t UCL	14.22
95% Hall's Bootstrap UCL	14.12
95% Percentile Bootstrap UCL	14.16
95% BCA Bootstrap UCL	14.14
95% Chebyshev(Mean, Sd) UCL	15.56
97.5% Chebyshev(Mean, Sd) UCL	16.49
99% Chebyshev(Mean, Sd) UCL	18.3

Data appear Normal (0.05)
May want to try Normal UCLs

Lithium

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	14.4
Maximum	32.5
Mean	21.14
Median	19.9
SD	5.166
Variance	26.68
Coefficient of Variation	0.244
Skewness	1.214
Mean of log data	3.027
SD of log data	0.229

95% Useful UCLs	
Student's-t UCL	**24.13**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	24.5
95% Modified-t UCL	24.24

Non-Parametric UCLs	
95% CLT UCL	23.83
95% Jackknife UCL	24.13
95% Standard Bootstrap UCL	23.69
95% Bootstrap-t UCL	25.68
95% Hall's Bootstrap UCL	40.06
95% Percentile Bootstrap UCL	23.85
95% BCA Bootstrap UCL	24.34
95% Chebyshev(Mean, Sd) UCL	28.26
97.5% Chebyshev(Mean, Sd) UCL	31.34
99% Chebyshev(Mean, Sd) UCL	37.39

Data appear Normal (0.05)
May want to try Normal UCLs

Manganese

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	284
Maximum	551
Mean	377.4
Median	333
SD	93.76
Variance	8791
Coefficient of Variation	0.248
Skewness	1.28
Mean of log data	5.909
SD of log data	0.227
95% Useful UCLs	
Student's-t UCL	431.8
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	439
95% Modified-t UCL	433.8
Non-Parametric UCLs	
95% CLT UCL	426.2
95% Jackknife UCL	431.8
95% Standard Bootstrap UCL	424.1
95% Bootstrap-t UCL	499.4
95% Hall's Bootstrap UCL	650.1
95% Percentile Bootstrap UCL	425.8
95% BCA Bootstrap UCL	435.2
95% Chebyshev(Mean, Sd) UCL	**506.6**
97.5% Chebyshev(Mean, Sd) UCL	562.6
99% Chebyshev(Mean, Sd) UCL	672.4

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Mercury

Number of Valid Observations	10
Number of Distinct Observations	8
Minimum	0.015
Maximum	0.03
Mean	0.0213
Median	0.0195
SD	0.00479
Variance	2.29E-05
Coefficient of Variation	0.225
Skewness	0.734
Mean of log data	-3.871
SD of log data	0.217

95% Useful UCLs	
Student's-t UCL	**0.0241**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	0.0242
95% Modified-t UCL	0.0241

Non-Parametric UCLs	
95% CLT UCL	0.0238
95% Jackknife UCL	0.0241
95% Standard Bootstrap UCL	0.0237
95% Bootstrap-t UCL	0.0247
95% Hall's Bootstrap UCL	0.0242
95% Percentile Bootstrap UCL	0.0238
95% BCA Bootstrap UCL	0.0238
95% Chebyshev(Mean, Sd) UCL	0.0279
97.5% Chebyshev(Mean, Sd) UCL	0.0308
99% Chebyshev(Mean, Sd) UCL	0.0364

Data appear Normal (0.05)
May want to try Normal UCLs

Molybdenum

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	0.42
Maximum	0.68
Mean	0.522
Median	0.505
SD	0.0739
Variance	0.00546
Coefficient of Variation	0.142
Skewness	0.94

Mean of log data	-0.659
SD of log data	0.137

95% Useful UCLs	
Student's-t UCL	**0.565**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	0.568
95% Modified-t UCL	0.566

Non-Parametric UCLs	
95% CLT UCL	0.56
95% Jackknife UCL	0.565
95% Standard Bootstrap UCL	0.559
95% Bootstrap-t UCL	0.578
95% Hall's Bootstrap UCL	0.582
95% Percentile Bootstrap UCL	0.561
95% BCA Bootstrap UCL	0.563
95% Chebyshev(Mean, Sd) UCL	0.624
97.5% Chebyshev(Mean, Sd) UCL	0.668
99% Chebyshev(Mean, Sd) UCL	0.755

Data appear Normal (0.05)
May want to try Normal UCLs

Phenanthrene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.137
Maximum Detected	0.137
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.00571
Maximum Non-detect	0.00803

Data set has all detected values equal to = 0.137, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.137

**** Instead of UCL, EPC is selected to be median = <0.00672**
[per recommendation in ProUCL User Guide]

Pyrene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.127

Maximum Detected	0.127
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.017
Maximum Non-detect	0.024

Data set has all detected values equal to = 0.127, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.127

**** Instead of UCL, EPC is selected to be median = <0.0200**
[per recommendation in ProUCL User Guide]

Zinc

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	36.6
Maximum	969
Mean	247
Median	75.5
SD	364.6
Variance	132938
Coefficient of Variation	1.476
Skewness	1.694
Mean of log data	4.667
SD of log data	1.272

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	458.3
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	502.6
95% Modified-t UCL	468.6
Non-Parametric UCLs	
95% CLT UCL	436.6
95% Jackknife UCL	458.3
95% Standard Bootstrap UCL	424.9
95% Bootstrap-t UCL	1356
95% Hall's Bootstrap UCL	1731
95% Percentile Bootstrap UCL	432.1
95% BCA Bootstrap UCL	507.2
95% Chebyshev(Mean, Sd) UCL	**749.5**
97.5% Chebyshev(Mean, Sd) UCL	967
99% Chebyshev(Mean, Sd) UCL	1394
Potential UCL to Use	
99% Chebyshev(Mean, Sd) UCL	1394

Recommended UCL exceeds the maximum observation

APPENDIX A-6

INTRACOASTAL WATERWAY SEDIMENT

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	c:\Users\Michael\. . . . \ProUCL data analysis\ICWsed - Just site data\ICWsed - Just site data_ProUCL sheets.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2-Dichloroethane

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.00302
Maximum Detected	0.00302
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.000184
Maximum Non-detect	0.000877

Data set has all detected values equal to = 0.00302, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00302

**** Instead of UCL, EPC is selected to be median = <0.000358**
[per recommendation in ProUCL User Guide]

1,2-Diphenylhydrazine/Azobenzen

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.0317
Maximum Detected	0.0317
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.0101
Maximum Non-detect	0.0146

Data set has all detected values equal to = 0.0317, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0317

**** Instead of UCL, EPC is selected to be median = <0.0110**
[per recommendation in ProUCL User Guide]

2-Methylnaphthalene

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.0188
Maximum Detected	0.0188
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.0132
Maximum Non-detect	0.0191

Data set has all detected values equal to = 0.0188, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects

Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0188

**** Instead of UCL, EPC is selected to be median = <0.0146**
[per recommendation in ProUCL User Guide]

3,3'-Dichlorobenzidine

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.151
Maximum Detected	0.151
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.0586
Maximum Non-detect	0.0846

Data set has all detected values equal to = 0.151, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.151

**** Instead of UCL, EPC is selected to be median = <0.0632**
[per recommendation in ProUCL User Guide]

4,4'-DDT

Total Number of Data	17
Number of Non-Detect Data	13
Number of Detected Data	**4**
Minimum Detected	4.81E-04
Maximum Detected	0.00332
Percent Non-Detects	**76.47%**
Minimum Non-detect	1.77E-04
Maximum Non-detect	6.31E-04

Mean of Detected Data	0.00137
Median of Detected Data	8.38E-04
Variance of Detected Data	1.77E-06
SD of Detected Data	0.00133
CV of Detected Data	0.971
Skewness of Detected Data	1.763
Mean of Detected log data	-6.905
SD of Detected Log data	0.874

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	15
Number treated as Detected	2
Single DL Percent Detection	88.24%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	6.90E-04
SD	6.73E-04
Standard Error of Mean	1.89E-04
95% KM (t) UCL	0.00102
95% KM (z) UCL	0.001
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.00136
95% KM (Chebyshev) UCL	0.00151
97.5% KM (Chebyshev) UCL	0.00187
99% KM (Chebyshev) UCL	0.00257

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.000203**
[per recommendation in ProUCL User Guide]

4,6-Dinitro-2-methylphenol

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.0627
Maximum Detected	0.0627
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.0245
Maximum Non-detect	0.0353

Data set has all detected values equal to = 0.0627, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0627

**** Instead of UCL, EPC is selected to be median = <0.0264**
[per recommendation in ProUCL User Guide]

Acenaphthene

Total Number of Data	16
Number of Non-Detect Data	14
Number of Detected Data	**2**
Minimum Detected	0.0239
Maximum Detected	0.0631
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.0122
Maximum Non-detect	0.0176
Mean of Detected Data	0.0435
Median of Detected Data	0.0435
Variance of Detected Data	7.68E-04
SD of Detected Data	0.0277
CV of Detected Data	0.637
Skewness of Detected Data	N/A
Mean of Detected log data	-3.248
SD of Detected Log data	0.686

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

the Largest DL value is used for all NDs

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0264
SD	0.00949
Standard Error of Mean	0.00335
95% KM (t) UCL	0.0322
95% KM (z) UCL	0.0319
95% KM (BCA) UCL	6.31%
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.041
97.5% KM (Chebyshev) UCL	0.0473
99% KM (Chebyshev) UCL	0.0597
Potential UCL to Use	
95% KM (t) UCL	0.0322
95% KM (% Bootstrap) UCL	N/A

**** Instead of UCL, EPC is selected to be median = <0.0135**
[per recommendation in ProUCL User Guide]

Aluminum

Number of Valid Observations	16
Number of Distinct Observations	16
Minimum	3900
Maximum	12500
Mean	6854
Median	6345
SD	2346
Variance	5502706
Coefficient of Variation	0.342
Skewness	0.876
Mean of log data	8.781
SD of log data	0.331

95% Useful UCLs
Student's-t UCL 7882

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	7956
95% Modified-t UCL	7904

Non-Parametric UCLs	
95% CLT UCL	7819
95% Jackknife UCL	7882
95% Standard Bootstrap UCL	7734
95% Bootstrap-t UCL	8049
95% Hall's Bootstrap UCL	8144
95% Percentile Bootstrap UCL	7782
95% BCA Bootstrap UCL	7899
95% Chebyshev(Mean, Sd) UCL	9411
97.5% Chebyshev(Mean, Sd) UCL	10517
99% Chebyshev(Mean, Sd) UCL	12689

Data appear Normal (0.05)
May want to try Normal UCLs

Anthracene

Total Number of Data	16
Number of Non-Detect Data	10
Number of Detected Data	**6**
Minimum Detected	0.0236
Maximum Detected	0.0753
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.0134
Maximum Non-detect	0.019
Mean of Detected Data	0.0407
Median of Detected Data	0.0333
Variance of Detected Data	4.37E-04
SD of Detected Data	0.0209
CV of Detected Data	0.513
Skewness of Detected Data	1.021
Mean of Detected log data	-3.304
SD of Detected Log data	0.487

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.03
SD	0.0143
Standard Error of Mean	0.00392
95% KM (t) UCL	0.0369
95% KM (z) UCL	0.0365
95% KM (BCA) UCL	0.0431
95% KM (Percentile Bootstrap) UCL	0.0397
95% KM (Chebyshev) UCL	0.0471
97.5% KM (Chebyshev) UCL	0.0545
99% KM (Chebyshev) UCL	0.069

Data appear Normal (0.05)

May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median =**	**<0.0178**
[per recommendation in ProUCL User Guide]	

Antimony

Number of Valid Observations	16
Number of Distinct Observations	16
Minimum	0.74
Maximum	8.14
Mean	2.245
Median	1.75
SD	1.751
Variance	3.066
Coefficient of Variation	0.78
Skewness	2.813
Mean of log data	0.629
SD of log data	0.57
95% Useful UCLs	
Student's-t UCL	3.012
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	3.294
95% Modified-t UCL	3.064
Non-Parametric UCLs	
95% CLT UCL	2.965
95% Jackknife UCL	3.012
95% Standard Bootstrap UCL	2.932
95% Bootstrap-t UCL	3.876
95% Hall's Bootstrap UCL	5.819
95% Percentile Bootstrap UCL	3.012
95% BCA Bootstrap UCL	3.276
95% Chebyshev(Mean, Sd) UCL	4.153
97.5% Chebyshev(Mean, Sd) UCL	**4.979**
99% Chebyshev(Mean, Sd) UCL	6.601

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Arsenic

Number of Valid Observations	16
Number of Distinct Observations	16
Minimum	2.41
Maximum	7.62
Mean	4.026
Median	3.805
SD	1.4
Variance	1.96
Coefficient of Variation	0.348
Skewness	1.175
Mean of log data	1.341
SD of log data	0.327
95% Useful UCLs	
Student's-t UCL	**4.64**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	4.712
95% Modified-t UCL	4.657
Non-Parametric UCLs	
95% CLT UCL	4.602
95% Jackknife UCL	4.64
95% Standard Bootstrap UCL	4.577
95% Bootstrap-t UCL	4.825
95% Hall's Bootstrap UCL	4.993
95% Percentile Bootstrap UCL	4.638
95% BCA Bootstrap UCL	4.73
95% Chebyshev(Mean, Sd) UCL	5.552
97.5% Chebyshev(Mean, Sd) UCL	6.212
99% Chebyshev(Mean, Sd) UCL	7.508

Data appear Normal (0.05)
May want to try Normal UCLs

Atrazine (Aatrex)

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.0814
Maximum Detected	0.0814
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.024
Maximum Non-detect	0.0346

Data set has all detected values equal to = 0.0814, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0814

**** Instead of UCL, EPC is selected to be median = <0.0259**
[per recommendation in ProUCL User Guide]

Barium

Number of Valid Observations	16
Number of Distinct Observations	14
Minimum	116
Maximum	377
Mean	215.3
Median	198
SD	59.65
Variance	3558
Coefficient of Variation	0.277
Skewness	1.296
Mean of log data	5.339
SD of log data	0.263
95% Useful UCLs	
Student's-t UCL	241.4
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	244.9
95% Modified-t UCL	242.2

Non-Parametric UCLs	
95% CLT UCL	239.8
95% Jackknife UCL	241.4
95% Standard Bootstrap UCL	238.7
95% Bootstrap-t UCL	250
95% Hall's Bootstrap UCL	263.8
95% Percentile Bootstrap UCL	241.7
95% BCA Bootstrap UCL	244.2
95% Chebyshev(Mean, Sd) UCL	280.3
97.5% Chebyshev(Mean, Sd) UCL	**308.4**
99% Chebyshev(Mean, Sd) UCL	363.6

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Benzo(a)anthracene

Total Number of Data	16
Number of Non-Detect Data	13
Number of Detected Data	**3**
Minimum Detected	0.0675
Maximum Detected	0.395
Percent Non-Detects	**81.25%**
Minimum Non-detect	0.0125
Maximum Non-detect	0.018
Mean of Detected Data	0.212
Median of Detected Data	0.172
Variance of Detected Data	0.028
SD of Detected Data	0.167
CV of Detected Data	0.791
Skewness of Detected Data	1.003
Mean of Detected log data	-1.795
SD of Detected Log data	0.884

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0945
SD	0.0816
Standard Error of Mean	0.025
95% KM (t) UCL	0.138
95% KM (z) UCL	0.136
95% KM (BCA) UCL	0.395
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.203

97.5% KM (Chebyshev) UCL	0.251
99% KM (Chebyshev) UCL	0.343

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0138**
[per recommendation in ProUCL User Guide]

Benzo(a)pyrene

Total Number of Data	16
Number of Non-Detect Data	10
Number of Detected Data	**6**
Minimum Detected	0.0525
Maximum Detected	0.445
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.0124
Maximum Non-detect	0.0176
Mean of Detected Data	0.165
Median of Detected Data	0.122
Variance of Detected Data	0.0209
SD of Detected Data	0.145
CV of Detected Data	0.879
Skewness of Detected Data	1.933
Mean of Detected log data	-2.063
SD of Detected Log data	0.755

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0946
SD	0.0974
Standard Error of Mean	0.0267
95% KM (t) UCL	0.141
95% KM (z) UCL	0.138
95% KM (BCA) UCL	0.189
95% KM (Percentile Bootstrap) UCL	0.158
95% KM (Chebyshev) UCL	0.211
97.5% KM (Chebyshev) UCL	0.261
99% KM (Chebyshev) UCL	0.36

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median = <0.0158**

[per recommendation in ProUCL User Guide]

Benzo(b)fluoranthene

Total Number of Data	16
Number of Non-Detect Data	7
Number of Detected Data	**9**
Minimum Detected	0.0324
Maximum Detected	0.611
Percent Non-Detects	**43.75%**
Minimum Non-detect	0.00865
Maximum Non-detect	0.0123

Mean of Detected Data	0.174
Median of Detected Data	0.131
Variance of Detected Data	0.0321
SD of Detected Data	0.179
CV of Detected Data	1.028
Skewness of Detected Data	2.123
Mean of Detected log data	-2.149
SD of Detected Log data	0.957

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.112
SD	0.145
Standard Error of Mean	0.0384
95% KM (t) UCL	0.18
95% KM (z) UCL	0.175
95% KM (BCA) UCL	0.196
95% KM (Percentile Bootstrap) UCL	0.185
95% KM (Chebyshev) UCL	0.28
97.5% KM (Chebyshev) UCL	**0.352**
99% KM (Chebyshev) UCL	0.495

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Benzo(g,h,i)perylene

Total Number of Data	16
Number of Non-Detect Data	9
Number of Detected Data	**7**
Minimum Detected	0.0173
Maximum Detected	0.442
Percent Non-Detects	**56.25%**
Minimum Non-detect	0.0124
Maximum Non-detect	0.0176

Mean of Detected Data	0.142
Median of Detected Data	0.069
Variance of Detected Data	0.0221
SD of Detected Data	0.149
CV of Detected Data	1.046
Skewness of Detected Data	1.69
Mean of Detected log data	-2.409
SD of Detected Log data	1.064

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	10
Number treated as Detected	6
Single DL Percent Detection	62.50%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.0719
SD	0.11
Standard Error of Mean	0.0297
95% KM (t) UCL	0.124
95% KM (z) UCL	0.121
95% KM (BCA) UCL	0.162
95% KM (Percentile Bootstrap) UCL	0.136
95% KM (Chebyshev) UCL	0.202
97.5% KM (Chebyshev) UCL	0.258
99% KM (Chebyshev) UCL	0.368

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0172**
[per recommendation in ProUCL User Guide]

Benzo(k)fluoranthene

Total Number of Data	16
Number of Non-Detect Data	10
Number of Detected Data	**6**
Minimum Detected	0.0474
Maximum Detected	0.318
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.0191
Maximum Non-detect	0.0272
Mean of Detected Data	0.139
Median of Detected Data	0.118
Variance of Detected Data	0.00945
SD of Detected Data	0.0972
CV of Detected Data	0.699
Skewness of Detected Data	1.495

Mean of Detected log data	-2.16
SD of Detected Log data	0.666

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0818
SD	0.0702
Standard Error of Mean	0.0192
95% KM (t) UCL	0.115
95% KM (z) UCL	0.113
95% KM (BCA) UCL	0.159
95% KM (Percentile Bootstrap) UCL	0.142
95% KM (Chebyshev) UCL	0.166
97.5% KM (Chebyshev) UCL	0.202
99% KM (Chebyshev) UCL	0.273

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0243**
[per recommendation in ProUCL User Guide]

Beryllium

Number of Valid Observations	16
Number of Distinct Observations	12
Minimum	0.29
Maximum	0.82
Mean	0.463
Median	0.42
SD	0.149
Variance	0.0222
Coefficient of Variation	0.322
Skewness	0.894
Mean of log data	-0.815
SD of log data	0.307

95% Useful UCLs	
Student's-t UCL	**0.528**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	0.533
95% Modified-t UCL	0.53

Non-Parametric UCLs	
95% CLT UCL	0.524
95% Jackknife UCL	0.528
95% Standard Bootstrap UCL	0.524
95% Bootstrap-t UCL	0.54

95% Hall's Bootstrap UCL	0.54
95% Percentile Bootstrap UCL	0.524
95% BCA Bootstrap UCL	0.533
95% Chebyshev(Mean, Sd) UCL	0.625
97.5% Chebyshev(Mean, Sd) UCL	0.696
99% Chebyshev(Mean, Sd) UCL	0.834

Data appear Normal (0.05)
May want to try Normal UCLs

Boron

Total Number of Data	16
Number of Non-Detect Data	6
Number of Detected Data	**10**
Minimum Detected	12.5
Maximum Detected	27.2
Percent Non-Detects	**37.50%**
Minimum Non-detect	1.35
Maximum Non-detect	1.92
Mean of Detected Data	18.82
Median of Detected Data	19.7
Variance of Detected Data	27.9
SD of Detected Data	5.282
CV of Detected Data	0.281
Skewness of Detected Data	0.171
Mean of Detected log data	2.898
SD of Detected Log data	0.287

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	0.287
Mean	13.19
SD	0.643
95% Winsor (t) UCL	13.57

Kaplan Meier (KM) Method	
Mean	16.45
SD	5.006
Standard Error of Mean	1.319
95% KM (t) UCL	18.76
95% KM (z) UCL	18.62
95% KM (BCA) UCL	19.25
95% KM (Percentile Bootstrap) UCL	18.86
95% KM (Chebyshev) UCL	22.2
97.5% KM (Chebyshev) UCL	**24.69**
99% KM (Chebyshev) UCL	29.58

Data appear Normal (0.05)
May want to try Normal UCLs

Butyl benzyl phthalate

Total Number of Data	16
Number of Non-Detect Data	15

Number of Detected Data	**1**
Minimum Detected	0.202
Maximum Detected	0.202
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.0153
Maximum Non-detect	0.0221

Data set has all detected values equal to = 0.202, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.202

**** Instead of UCL, EPC is selected to be median = <0.0165**
[per recommendation in ProUCL User Guide]

Carbazole

Total Number of Data	16
Number of Non-Detect Data	13
Number of Detected Data	**3**
Minimum Detected	0.0195
Maximum Detected	0.0861
Percent Non-Detects	**81.25%**
Minimum Non-detect	0.0121
Maximum Non-detect	0.0174
Mean of Detected Data	0.0504
Median of Detected Data	0.0457
Variance of Detected Data	0.00113
SD of Detected Data	0.0336
CV of Detected Data	0.665
Skewness of Detected Data	0.622
Mean of Detected log data	-3.158
SD of Detected Log data	0.745

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0253
SD	0.0169
Standard Error of Mean	0.00518
95% KM (t) UCL	0.0344
95% KM (z) UCL	0.0338
95% KM (BCA) UCL	0.0861
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0479

97.5% KM (Chebyshev) UCL	0.0577
99% KM (Chebyshev) UCL	0.0769

Data appear Normal (0.05)
May want to try Normal UCLs

** Instead of UCL, EPC is selected to be median = <0.0138
[per recommendation in ProUCL User Guide]

Chloroform

Total Number of Data	16
Number of Non-Detect Data	14
Number of Detected Data	**2**
Minimum Detected	0.00504
Maximum Detected	0.00527
Percent Non-Detects	**87.50%**
Minimum Non-detect	2.28E-04
Maximum Non-detect	0.00108
Mean of Detected Data	0.00516
Median of Detected Data	0.00516
Variance of Detected Data	2.65E-08
SD of Detected Data	1.63E-04
CV of Detected Data	0.0315
Skewness of Detected Data	N/A
Mean of Detected log data	-5.268
SD of Detected Log data	0.0316

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00505
SD	5.57E-05
Standard Error of Mean	1.97E-05
95% KM (t) UCL	0.00509
95% KM (z) UCL	0.00509
95% KM (BCA) UCL	0.00527
95% KM (Percentile Bootstrap) UCL	0.00527
95% KM (Chebyshev) UCL	0.00514
97.5% KM (Chebyshev) UCL	0.00518

99% KM (Chebyshev) UCL	0.00525
Potential UCL to Use	
95% KM (t) UCL	0.00509
95% KM (% Bootstrap) UCL	0.00527

**** Instead of UCL, EPC is selected to be median = <0.000442**
[per recommendation in ProUCL User Guide]

Chromium

Number of Valid Observations	16
Number of Distinct Observations	15
Minimum	5.01
Maximum	14.4
Mean	9.214
Median	10.19
SD	2.644
Variance	6.989
Coefficient of Variation	0.287
Skewness	-0.17
Mean of log data	2.177
SD of log data	0.314
95% Useful UCLs	
Student's-t UCL	**10.37**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	10.27
95% Modified-t UCL	10.37
Non-Parametric UCLs	
95% CLT UCL	10.3
95% Jackknife UCL	10.37
95% Standard Bootstrap UCL	10.29
95% Bootstrap-t UCL	10.31
95% Hall's Bootstrap UCL	10.31
95% Percentile Bootstrap UCL	10.29
95% BCA Bootstrap UCL	10.16
95% Chebyshev(Mean, Sd) UCL	12.09
97.5% Chebyshev(Mean, Sd) UCL	13.34
99% Chebyshev(Mean, Sd) UCL	15.79

Data appear Normal (0.05)
May want to try Normal UCLs

Chrysene

Total Number of Data	16
Number of Non-Detect Data	6
Number of Detected Data	**10**
Minimum Detected	0.0137
Maximum Detected	0.475
Percent Non-Detects	**37.50%**
Minimum Non-detect	0.0109
Maximum Non-detect	0.0151
Mean of Detected Data	0.12
Median of Detected Data	0.0825
Variance of Detected Data	0.0196

SD of Detected Data	0.14
CV of Detected Data	1.166
Skewness of Detected Data	2.074
Mean of Detected log data	-2.711
SD of Detected Log data	1.199

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	8
Number treated as Detected	8
Single DL Percent Detection	50.00%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0803
SD	0.117
Standard Error of Mean	0.0308
95% KM (t) UCL	0.134
95% KM (z) UCL	0.131
95% KM (BCA) UCL	0.141
95% KM (Percentile Bootstrap) UCL	0.135
95% KM (Chebyshev) UCL	0.215
97.5% KM (Chebyshev) UCL	**0.273**
99% KM (Chebyshev) UCL	0.387

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Cobalt

Number of Valid Observations	16
Number of Distinct Observations	16
Minimum	3.05
Maximum	7.16
Mean	4.385
Median	4.06
SD	1.131
Variance	1.279
Coefficient of Variation	0.258
Skewness	0.956
Mean of log data	1.449
SD of log data	0.245

95% Useful UCLs	
Student's-t UCL	**4.881**

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	4.922
95% Modified-t UCL	4.892

Non-Parametric UCLs

95% CLT UCL	4.85
95% Jackknife UCL	4.881
95% Standard Bootstrap UCL	4.83
95% Bootstrap-t UCL	4.957
95% Hall's Bootstrap UCL	5.007
95% Percentile Bootstrap UCL	4.847

95% BCA Bootstrap UCL	4.876
95% Chebyshev(Mean, Sd) UCL	5.618
97.5% Chebyshev(Mean, Sd) UCL	6.151
99% Chebyshev(Mean, Sd) UCL	7.198

Data appear Normal (0.05)
May want to try Normal UCLs

Copper

Number of Valid Observations	16
Number of Distinct Observations	16
Minimum	3.28
Maximum	12.6
Mean	7.112
Median	6.655
SD	2.997
Variance	8.98
Coefficient of Variation	0.421
Skewness	0.299
Mean of log data	1.87
SD of log data	0.456

95% Useful UCLs	
Student's-t UCL	**8.425**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	8.404
95% Modified-t UCL	8.435
Non-Parametric UCLs	
95% CLT UCL	8.344
95% Jackknife UCL	8.425
95% Standard Bootstrap UCL	8.306
95% Bootstrap-t UCL	8.514
95% Hall's Bootstrap UCL	8.371
95% Percentile Bootstrap UCL	8.295
95% BCA Bootstrap UCL	8.335
95% Chebyshev(Mean, Sd) UCL	10.38
97.5% Chebyshev(Mean, Sd) UCL	11.79
99% Chebyshev(Mean, Sd) UCL	14.57

Data appear Normal (0.05)
May want to try Normal UCLs

Cyclohexane

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.00192
Maximum Detected	0.00912
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.00179
Maximum Non-detect	0.00851

Data set has all detected values equal to = 0.00192, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00192

** Instead of UCL, EPC is selected to be median = <0.00329
[per recommendation in ProUCL User Guide]

Dibenz(a,h)anthracene

Total Number of Data	16
Number of Non-Detect Data	10
Number of Detected Data	**6**
Minimum Detected	0.0511
Maximum Detected	0.235
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.0118
Maximum Non-detect	0.0168

Mean of Detected Data	0.105
Median of Detected Data	0.0659
Variance of Detected Data	0.00541
SD of Detected Data	0.0735
CV of Detected Data	0.701
Skewness of Detected Data	1.464
Mean of Detected log data	-2.428
SD of Detected Log data	0.612

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0712
SD	0.0486
Standard Error of Mean	0.0133
95% KM (t) UCL	0.0946
95% KM (z) UCL	0.0932
95% KM (BCA) UCL	0.111
95% KM (Percentile Bootstrap) UCL	0.0989
95% KM (Chebyshev) UCL	0.129
97.5% KM (Chebyshev) UCL	0.154
99% KM (Chebyshev) UCL	0.204

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

** Instead of UCL, EPC is selected to be median = <0.0157
[per recommendation in ProUCL User Guide]

Dibenzofuran

Total Number of Data	16
Number of Non-Detect Data	14
Number of Detected Data	**2**

Minimum Detected	0.0268
Maximum Detected	0.0305
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.0173
Maximum Non-detect	0.025
Mean of Detected Data	0.0287
Median of Detected Data	0.0287
Variance of Detected Data	6.85E-06
SD of Detected Data	0.00262
CV of Detected Data	0.0913
Skewness of Detected Data	N/A
Mean of Detected log data	-3.555
SD of Detected Log data	0.0914

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.027
SD	8.96E-04
Standard Error of Mean	3.17E-04
95% KM (t) UCL	0.0276
95% KM (z) UCL	0.0276
95% KM (BCA) UCL	0.0305
95% KM (Percentile Bootstrap) UCL	0.0305
95% KM (Chebyshev) UCL	0.0284
97.5% KM (Chebyshev) UCL	0.029
99% KM (Chebyshev) UCL	0.0302
Potential UCL to Use	
95% KM (t) UCL	0.0276
95% KM (% Bootstrap) UCL	0.0305

**** Instead of UCL, EPC is selected to be median = <0.0192**
[per recommendation in ProUCL User Guide]

Diethyl phthalate

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**

Minimum Detected	0.0389
Maximum Detected	0.0389
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.0208
Maximum Non-detect	0.03

Data set has all detected values equal to = 0.0389, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0389

**** Instead of UCL, EPC is selected to be median = <0.0224**
[per recommendation in ProUCL User Guide]

Di-n-octyl phthalate

Total Number of Data	16
Number of Non-Detect Data	14
Number of Detected Data	**2**
Minimum Detected	0.0147
Maximum Detected	0.192
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.0102
Maximum Non-detect	0.0147
Mean of Detected Data	0.103
Median of Detected Data	0.103
Variance of Detected Data	0.0157
SD of Detected Data	0.125
CV of Detected Data	1.213
Skewness of Detected Data	N/A
Mean of Detected log data	-2.935
SD of Detected Log data	1.817

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0258
SD	0.0429
Standard Error of Mean	0.0152
95% KM (t) UCL	0.0524

95% KM (z) UCL	0.0507
95% KM (BCA) UCL	0.192
95% KM (Percentile Bootstrap) UCL	0.192
95% KM (Chebyshev) UCL	0.0919
97.5% KM (Chebyshev) UCL	0.121
99% KM (Chebyshev) UCL	0.177

Potential UCL to Use

**** Instead of UCL, EPC is selected to be median = <0.0113**
[per recommendation in ProUCL User Guide]

Fluoranthene

Total Number of Data	16
Number of Non-Detect Data	8
Number of Detected Data	**8**
Minimum Detected	0.0222
Maximum Detected	0.804
Percent Non-Detects	**50.00%**
Minimum Non-detect	0.0137
Maximum Non-detect	0.0196

Mean of Detected Data	0.218
Median of Detected Data	0.161
Variance of Detected Data	0.0618
SD of Detected Data	0.249
CV of Detected Data	1.143
Skewness of Detected Data	2.315
Mean of Detected log data	-2.036
SD of Detected Log data	1.143

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.12
SD	0.191
Standard Error of Mean	0.0511
95% KM (t) UCL	0.209
95% KM (z) UCL	0.204
95% KM (BCA) UCL	0.251
95% KM (Percentile Bootstrap) UCL	0.223
95% KM (Chebyshev) UCL	0.343
97.5% KM (Chebyshev) UCL	**0.439**
99% KM (Chebyshev) UCL	0.628

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Fluorene

Total Number of Data	16
Number of Non-Detect Data	12
Number of Detected Data	**4**
Minimum Detected	0.0124
Maximum Detected	0.046
Percent Non-Detects	**75.00%**
Minimum Non-detect	0.012
Maximum Non-detect	0.0173

Mean of Detected Data	0.0276
Median of Detected Data	0.0259
Variance of Detected Data	1.94E-04
SD of Detected Data	0.0139
CV of Detected Data	0.506
Skewness of Detected Data	0.682
Mean of Detected log data	-3.695
SD of Detected Log data	0.54

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	13
Number treated as Detected	3
Single DL Percent Detection	81.25%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0162
SD	0.00891
Standard Error of Mean	0.00257
95% KM (t) UCL	0.0207
95% KM (z) UCL	0.0204
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.03
95% KM (Chebyshev) UCL	0.0274
97.5% KM (Chebyshev) UCL	0.0323
99% KM (Chebyshev) UCL	0.0418

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0138**
[per recommendation in ProUCL User Guide]

gamma-Chlordane

Total Number of Data	16
Number of Non-Detect Data	12

Number of Detected Data	**4**
Minimum Detected	6.38E-04
Maximum Detected	8.26E-04
Percent Non-Detects	**75.00%**
Minimum Non-detect	3.19E-04
Maximum Non-detect	4.51E-04
Mean of Detected Data	7.02E-04
Median of Detected Data	6.72E-04
Variance of Detected Data	7.22E-09
SD of Detected Data	8.50E-05
CV of Detected Data	0.121
Skewness of Detected Data	1.69
Mean of Detected log data	-7.267
SD of Detected Log data	0.116

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	6.54E-04
SD	4.61E-05
Standard Error of Mean	1.33E-05
95% KM (t) UCL	6.77E-04
95% KM (z) UCL	6.76E-04
95% KM (BCA) UCL	8.26E-04
95% KM (Percentile Bootstrap) UCL	7.04E-04
95% KM (Chebyshev) UCL	7.12E-04
97.5% KM (Chebyshev) UCL	7.37E-04
99% KM (Chebyshev) UCL	7.86E-04

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.000391**
[per recommendation in ProUCL User Guide]

Hexachlorobenzene

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.0319
Maximum Detected	0.0319
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.015
Maximum Non-detect	0.0217

Data set has all detected values equal to = 0.0319, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects

Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0319

**** Instead of UCL, EPC is selected to be median = <0.0162**
[per recommendation in ProUCL User Guide]

Indeno(1,2,3-cd)pyrene

Total Number of Data	16
Number of Non-Detect Data	10
Number of Detected Data	**6**
Minimum Detected	0.0556
Maximum Detected	0.405
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.0198
Maximum Non-detect	0.0282
Mean of Detected Data	0.174
Median of Detected Data	0.147
Variance of Detected Data	0.0169
SD of Detected Data	0.13
CV of Detected Data	0.747
Skewness of Detected Data	1.29
Mean of Detected log data	-1.976
SD of Detected Log data	0.739

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0999
SD	0.0925
Standard Error of Mean	0.0253
95% KM (t) UCL	0.144
95% KM (z) UCL	0.142
95% KM (BCA) UCL	0.225
95% KM (Percentile Bootstrap) UCL	0.167
95% KM (Chebyshev) UCL	0.21
97.5% KM (Chebyshev) UCL	0.258
99% KM (Chebyshev) UCL	0.352

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0253**
[per recommendation in ProUCL User Guide]

Iron

Number of Valid Observations	16

Number of Distinct Observations	16
Minimum	6750
Maximum	28200
Mean	13352
Median	13200
SD	5546
Variance	30754190
Coefficient of Variation	0.415
Skewness	1.341
Mean of log data	9.427
SD of log data	0.389
95% Useful UCLs	
Student's-t UCL	15782
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	16129
95% Modified-t UCL	15860
Non-Parametric UCLs	
95% CLT UCL	15632
95% Jackknife UCL	15782
95% Standard Bootstrap UCL	15594
95% Bootstrap-t UCL	16690
95% Hall's Bootstrap UCL	18534
95% Percentile Bootstrap UCL	15569
95% BCA Bootstrap UCL	16013
95% Chebyshev(Mean, Sd) UCL	19395
97.5% Chebyshev(Mean, Sd) UCL	**22010**
99% Chebyshev(Mean, Sd) UCL	27146

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Isopropylbenzene (Cumene)

Total Number of Data	16
Number of Non-Detect Data	14
Number of Detected Data	**2**
Minimum Detected	0.00464
Maximum Detected	0.00704
Percent Non-Detects	**87.50%**
Minimum Non-detect	2.48E-04
Maximum Non-detect	0.00118
Mean of Detected Data	0.00584
Median of Detected Data	0.00584
Variance of Detected Data	2.88E-06
SD of Detected Data	0.0017
CV of Detected Data	0.291
Skewness of Detected Data	N/A
Mean of Detected log data	-5.165
SD of Detected Log data	0.295

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00479
SD	5.81E-04
Standard Error of Mean	2.05E-04
95% KM (t) UCL	0.00515
95% KM (z) UCL	0.00513
95% KM (BCA) UCL	0.00704
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.00569
97.5% KM (Chebyshev) UCL	0.00607
99% KM (Chebyshev) UCL	0.00683
Potential UCL to Use	
95% KM (t) UCL	0.00515
95% KM (% Bootstrap) UCL	N/A

**** Instead of UCL, EPC is selected to be median = <0.000480**
[per recommendation in ProUCL User Guide]

Lead

Number of Valid Observations	16
Number of Distinct Observations	16
Minimum	5
Maximum	32.3
Mean	11.56
Median	10.03
SD	7.161
Variance	51.28
Coefficient of Variation	0.62
Skewness	2.013
Mean of log data	2.311
SD of log data	0.512
95% Useful UCLs	
Student's-t UCL	14.69
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	15.46
95% Modified-t UCL	14.84
Non-Parametric UCLs	
95% CLT UCL	14.5
95% Jackknife UCL	14.69
95% Standard Bootstrap UCL	14.34
95% Bootstrap-t UCL	18.14
95% Hall's Bootstrap UCL	31.58

95% Percentile Bootstrap UCL	14.62
95% BCA Bootstrap UCL	15.47
95% Chebyshev(Mean, Sd) UCL	19.36
97.5% Chebyshev(Mean, Sd) UCL	**22.74**
99% Chebyshev(Mean, Sd) UCL	29.37

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Lithium

Number of Valid Observations	16
Number of Distinct Observations	15
Minimum	6.4
Maximum	20
Mean	10.53
Median	9.88
SD	3.559
Variance	12.67
Coefficient of Variation	0.338
Skewness	1.247
Mean of log data	2.306
SD of log data	0.314

95% Useful UCLs	
Student's-t UCL	**12.09**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	12.29
95% Modified-t UCL	12.14

Non-Parametric UCLs	
95% CLT UCL	12
95% Jackknife UCL	12.09
95% Standard Bootstrap UCL	11.96
95% Bootstrap-t UCL	12.73
95% Hall's Bootstrap UCL	12.79
95% Percentile Bootstrap UCL	12.04
95% BCA Bootstrap UCL	12.17
95% Chebyshev(Mean, Sd) UCL	14.41
97.5% Chebyshev(Mean, Sd) UCL	16.09
99% Chebyshev(Mean, Sd) UCL	19.39

Data appear Normal (0.05)
May want to try Normal UCLs

Manganese

Number of Valid Observations	16
Number of Distinct Observations	15
Minimum	192
Maximum	474
Mean	283.3
Median	275
SD	87.59
Variance	7673
Coefficient of Variation	0.309
Skewness	0.667
Mean of log data	5.603
SD of log data	0.301

95% Useful UCLs	
Student's-t UCL	**321.6**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	323.2
95% Modified-t UCL	322.2

Non-Parametric UCLs	
95% CLT UCL	319.3
95% Jackknife UCL	321.6
95% Standard Bootstrap UCL	317.6
95% Bootstrap-t UCL	331.6
95% Hall's Bootstrap UCL	322.6
95% Percentile Bootstrap UCL	322.1
95% BCA Bootstrap UCL	324
95% Chebyshev(Mean, Sd) UCL	378.7
97.5% Chebyshev(Mean, Sd) UCL	420
99% Chebyshev(Mean, Sd) UCL	501.1

Data appear Normal (0.05)
May want to try Normal UCLs

Mercury

Number of Valid Observations	16
Number of Distinct Observations	13
Minimum	0.011
Maximum	0.036
Mean	0.0201
Median	0.02
SD	0.00739
Variance	5.46E-05
Coefficient of Variation	0.368
Skewness	0.618
Mean of log data	-3.972
SD of log data	0.367

95% Useful UCLs	
Student's-t UCL	**0.0233**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	0.0234
95% Modified-t UCL	0.0233

Non-Parametric UCLs	
95% CLT UCL	0.0231
95% Jackknife UCL	0.0233
95% Standard Bootstrap UCL	0.023
95% Bootstrap-t UCL	0.0236
95% Hall's Bootstrap UCL	0.0236
95% Percentile Bootstrap UCL	0.0231
95% BCA Bootstrap UCL	0.023
95% Chebyshev(Mean, Sd) UCL	0.0281
97.5% Chebyshev(Mean, Sd) UCL	0.0316
99% Chebyshev(Mean, Sd) UCL	0.0384

Data appear Normal (0.05)
May want to try Normal UCLs

Methylcyclohexane

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.0037
Maximum Detected	0.0037
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.000599
Maximum Non-detect	0.00285

Data set has all detected values equal to = 0.0037, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0037

**** Instead of UCL, EPC is selected to be median = <0.00117**
[per recommendation in ProUCL User Guide]

Molybdenum

Number of Valid Observations	16
Number of Distinct Observations	15
Minimum	0.14
Maximum	5.66
Mean	0.667
Median	0.24
SD	1.358
Variance	1.843
Coefficient of Variation	2.036
Skewness	3.761
Mean of log data	-1.108
SD of log data	0.95

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	1.262
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	1.566
95% Modified-t UCL	1.315
Non-Parametric UCLs	
95% CLT UCL	1.225
95% Jackknife UCL	1.262
95% Standard Bootstrap UCL	1.206
95% Bootstrap-t UCL	4.6
95% Hall's Bootstrap UCL	3.351
95% Percentile Bootstrap UCL	1.312
95% BCA Bootstrap UCL	1.703
95% Chebyshev(Mean, Sd) UCL	2.146
97.5% Chebyshev(Mean, Sd) UCL	2.786
99% Chebyshev(Mean, Sd) UCL	4.044

Potential UCL to Use
Use 95% Chebyshev (Mean, Sd) UCL 2.146

Nickel

Number of Valid Observations	16
Number of Distinct Observations	15

Minimum	5.8
Maximum	16.7
Mean	9.589
Median	9.93
SD	2.741
Variance	7.512
Coefficient of Variation	0.286
Skewness	0.821
Mean of log data	2.223
SD of log data	0.283

95% Useful UCLs	
Student's-t UCL	**10.79**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	10.87
95% Modified-t UCL	10.81

Non-Parametric UCLs	
95% CLT UCL	10.72
95% Jackknife UCL	10.79
95% Standard Bootstrap UCL	10.68
95% Bootstrap-t UCL	10.9
95% Hall's Bootstrap UCL	11.23
95% Percentile Bootstrap UCL	10.74
95% BCA Bootstrap UCL	10.87
95% Chebyshev(Mean, Sd) UCL	12.58
97.5% Chebyshev(Mean, Sd) UCL	13.87
99% Chebyshev(Mean, Sd) UCL	16.41

Data appear Normal (0.05)
May want to try Normal UCLs

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n-Nitrosodiphenylamine

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.0434
Maximum Detected	0.0434
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.0139
Maximum Non-detect	0.0201

Data set has all detected values equal to = 0.0434, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0434

**** Instead of UCL, EPC is selected to be median = <0.0150**
[per recommendation in ProUCL User Guide]

Phenanthrene

Total Number of Data	16
Number of Non-Detect Data	8
Number of Detected Data	**8**
Minimum Detected	0.0311
Maximum Detected	0.508
Percent Non-Detects	**50.00%**

Minimum Non-detect	0.0152
Maximum Non-detect	0.0216
Mean of Detected Data	0.14
Median of Detected Data	0.0953
Variance of Detected Data	0.0242
SD of Detected Data	0.155
CV of Detected Data	1.107
Skewness of Detected Data	2.358
Mean of Detected log data	-2.349
SD of Detected Log data	0.892

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0858
SD	0.116
Standard Error of Mean	0.0311
95% KM (t) UCL	0.14
95% KM (z) UCL	0.137
95% KM (BCA) UCL	0.159
95% KM (Percentile Bootstrap) UCL	0.142
95% KM (Chebyshev) UCL	0.221
97.5% KM (Chebyshev) UCL	**0.28**
99% KM (Chebyshev) UCL	0.396

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Pyrene

Total Number of Data	16
Number of Non-Detect Data	6
Number of Detected Data	**10**
Minimum Detected	0.0176
Maximum Detected	0.862
Percent Non-Detects	**37.50%**
Minimum Non-detect	0.0146
Maximum Non-detect	0.0202
Mean of Detected Data	0.203
Median of Detected Data	0.146
Variance of Detected Data	0.0652
SD of Detected Data	0.255
CV of Detected Data	1.258
Skewness of Detected Data	2.208
Mean of Detected log data	-2.308
SD of Detected Log data	1.341

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),	
Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	7
Number treated as Detected	9
Single DL Percent Detection	43.75%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.133
SD	0.211
Standard Error of Mean	0.0557
95% KM (t) UCL	0.231
95% KM (z) UCL	0.225
95% KM (BCA) UCL	0.248
95% KM (Percentile Bootstrap) UCL	0.231
95% KM (Chebyshev) UCL	0.376
97.5% KM (Chebyshev) UCL	**0.482**
99% KM (Chebyshev) UCL	0.688

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Silver

Total Number of Data	16
Number of Non-Detect Data	10
Number of Detected Data	**6**
Minimum Detected	0.3
Maximum Detected	0.54
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.067
Maximum Non-detect	0.094

Mean of Detected Data	0.393
Median of Detected Data	0.39
Variance of Detected Data	0.00695
SD of Detected Data	0.0833
CV of Detected Data	0.212
Skewness of Detected Data	1.083
Mean of Detected log data	-0.951
SD of Detected Log data	0.203

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.335

SD	0.0649
Standard Error of Mean	0.0178
95% KM (t) UCL	0.366
95% KM (z) UCL	0.364
95% KM (BCA) UCL	0.418
95% KM (Percentile Bootstrap) UCL	0.401
95% KM (Chebyshev) UCL	0.412
97.5% KM (Chebyshev) UCL	0.446
99% KM (Chebyshev) UCL	0.512

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0895**
[per recommendation in ProUCL User Guide]

Strontium

Number of Valid Observations	16
Number of Distinct Observations	15
Minimum	32.8
Maximum	81.7
Mean	44.86
Median	39.85
SD	14.43
Variance	208.3
Coefficient of Variation	0.322
Skewness	1.805
Mean of log data	3.765
SD of log data	0.274

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	51.19
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	52.54
95% Modified-t UCL	51.46
Non-Parametric UCLs	
95% CLT UCL	50.8
95% Jackknife UCL	51.19
95% Standard Bootstrap UCL	50.5
95% Bootstrap-t UCL	56.98
95% Hall's Bootstrap UCL	82.31
95% Percentile Bootstrap UCL	51.29
95% BCA Bootstrap UCL	51.61
95% Chebyshev(Mean, Sd) UCL	60.59
97.5% Chebyshev(Mean, Sd) UCL	67.4
99% Chebyshev(Mean, Sd) UCL	80.77

Potential UCL to Use

Use 95% Student's-t UCL	51.19
Or 95% Modified-t UCL	**51.46**

Titanium

Number of Valid Observations	16
Number of Distinct Observations	16

Minimum	19.1
Maximum	36.6
Mean	25.58
Median	23.95
SD	5.051
Variance	25.51
Coefficient of Variation	0.198
Skewness	1.084
Mean of log data	3.225
SD of log data	0.186

95% Useful UCLs	
Student's-t UCL	**27.79**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	28.02
95% Modified-t UCL	27.85

Non-Parametric UCLs	
95% CLT UCL	27.65
95% Jackknife UCL	27.79
95% Standard Bootstrap UCL	27.55
95% Bootstrap-t UCL	28.62
95% Hall's Bootstrap UCL	28.98
95% Percentile Bootstrap UCL	27.63
95% BCA Bootstrap UCL	27.97
95% Chebyshev(Mean, Sd) UCL	31.08
97.5% Chebyshev(Mean, Sd) UCL	33.46
99% Chebyshev(Mean, Sd) UCL	38.14

Data appear Normal (0.05)
May want to try Normal UCLs

Toluene

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.00581
Maximum Detected	0.00581
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.00089
Maximum Non-detect	0.00423

Data set has all detected values equal to = 0.00581, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00581

**** Instead of UCL, EPC is selected to be median = <0.00173**
[per recommendation in ProUCL User Guide]

Vanadium

Number of Valid Observations	16
Number of Distinct Observations	16
Minimum	9.06
Maximum	21.2
Mean	13.86
Median	13.45

SD	3.523
Variance	12.41
Coefficient of Variation	0.254
Skewness	0.54
Mean of log data	2.599
SD of log data	0.251
95% Useful UCLs	
Student's-t UCL	**15.4**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	15.44
95% Modified-t UCL	15.42
Non-Parametric UCLs	
95% CLT UCL	15.31
95% Jackknife UCL	15.4
95% Standard Bootstrap UCL	15.23
95% Bootstrap-t UCL	15.63
95% Hall's Bootstrap UCL	15.38
95% Percentile Bootstrap UCL	15.29
95% BCA Bootstrap UCL	15.37
95% Chebyshev(Mean, Sd) UCL	17.7
97.5% Chebyshev(Mean, Sd) UCL	19.36
99% Chebyshev(Mean, Sd) UCL	22.62

Data appear Normal (0.05)
May want to try Normal UCLs

Zinc

Number of Valid Observations	16
Number of Distinct Observations	15
Minimum	18
Maximum	92.6
Mean	45.36
Median	43.6
SD	19.88
Variance	395.3
Coefficient of Variation	0.438
Skewness	0.681
Mean of log data	3.722
SD of log data	0.454
95% Useful UCLs	
Student's-t UCL	**54.07**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	54.44
95% Modified-t UCL	54.21
Non-Parametric UCLs	
95% CLT UCL	53.53
95% Jackknife UCL	54.07
95% Standard Bootstrap UCL	53.02
95% Bootstrap-t UCL	55.22
95% Hall's Bootstrap UCL	55.11
95% Percentile Bootstrap UCL	53.7
95% BCA Bootstrap UCL	54.66
95% Chebyshev(Mean, Sd) UCL	67.02
97.5% Chebyshev(Mean, Sd) UCL	76.4
99% Chebyshev(Mean, Sd) UCL	94.81

Data appear Normal (0.05)
May want to try Normal UCLs

APPENDIX A-7

BACKGROUND SEDIMENT INTERCOASTAL WATERWAY

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options		
From File	C:\Users\Michael\ . . . . \ProUCL data analysis\ICWsed - JUST BACKGROUND\ICWsed data - JUST BACKGROUND_ProUCL input.wst	
Full Precision	OFF	
Confidence Coefficient	95%	
Number of Bootstrap Operations	2000	

1,2,4-Trimethylbenzene

Total Number of Data	9
Number of Non-Detect Data	8
Number of Detected Data	**1**
Minimum Detected	0.00391
Maximum Detected	0.00391
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.00032
Maximum Non-detect	0.00308

Data set has all detected values equal to = 0.00391, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00391

**** Instead of UCL, EPC is selected to be median = <0.000724**
[per recommendation in ProUCL User Guide]

1,4-Dichlorobenzene

Total Number of Data	9
Number of Non-Detect Data	8
Number of Detected Data	**1**
Minimum Detected	0.00411
Maximum Detected	0.00411
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.000681
Maximum Non-detect	0.00352

Data set has all detected values equal to = 0.00411, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00411

**** Instead of UCL, EPC is selected to be median = <0.00154**
[per recommendation in ProUCL User Guide]

2-Butanone

Total Number of Data	9
Number of Non-Detect Data	7
Number of Detected Data	**2**
Minimum Detected	0.002
Maximum Detected	0.00216
Percent Non-Detects	**77.78%**
Minimum Non-detect	5.05E-04
Maximum Non-detect	0.00486
Mean of Detected Data	0.00208
Median of Detected Data	0.00208

Variance of Detected Data	1.28E-08
SD of Detected Data	1.13E-04
CV of Detected Data	0.0544
Skewness of Detected Data	N/A
Mean of Detected log data	-6.176
SD of Detected Log data	0.0544

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	9
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00203
SD	5.96E-05
Standard Error of Mean	3.44E-05
95% KM (t) UCL	0.00209
95% KM (z) UCL	0.00208
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.00216
95% KM (Chebyshev) UCL	0.00218
97.5% KM (Chebyshev) UCL	0.00224
99% KM (Chebyshev) UCL	0.00237
Potential UCL to Use	
95% KM (t) UCL	0.00209
95% KM (% Bootstrap) UCL	0.00216

**** Instead of UCL, EPC is selected to be median = <0.00200**
[per recommendation in ProUCL User Guide]

4,4'-DDT

Total Number of Data	9
Number of Non-Detect Data	8
Number of Detected Data	**1**
Minimum Detected	0.00057
Maximum Detected	0.00057
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.00018

Maximum Non-detect	0.00023

Data set has all detected values equal to = 5.7000E-4, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00057

**** Instead of UCL, EPC is selected to be median = <0.00021**
[per recommendation in ProUCL User Guide]

Aluminum

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	4730
Maximum	21800
Mean	12213
Median	10800
SD	6892
Variance	47504575
Coefficient of Variation	0.564
Skewness	0.403
Mean of log data	9.255
SD of log data	0.604

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**16486**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	16322
95% Modified-t UCL	16537
Non-Parametric UCLs	
95% CLT UCL	15992
95% Jackknife UCL	16486
95% Standard Bootstrap UCL	15840
95% Bootstrap-t UCL	16940
95% Hall's Bootstrap UCL	15693
95% Percentile Bootstrap UCL	15956
95% BCA Bootstrap UCL	15922
95% Chebyshev(Mean, Sd) UCL	22228
97.5% Chebyshev(Mean, Sd) UCL	26561
99% Chebyshev(Mean, Sd) UCL	35073

Data appear Normal (0.05)
May want to try Normal UCLs

Antimony

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	1.68
Maximum	7.33
Mean	4.023

Median	2.83
SD	2.215
Variance	4.905
Coefficient of Variation	0.55
Skewness	0.488
Mean of log data	1.251
SD of log data	0.568

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**5.396**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	5.366
95% Modified-t UCL	5.416

Non-Parametric UCLs	
95% CLT UCL	5.238
95% Jackknife UCL	5.396
95% Standard Bootstrap UCL	5.197
95% Bootstrap-t UCL	5.622
95% Hall's Bootstrap UCL	5.022
95% Percentile Bootstrap UCL	5.148
95% BCA Bootstrap UCL	5.33
95% Chebyshev(Mean, Sd) UCL	7.241
97.5% Chebyshev(Mean, Sd) UCL	8.634
99% Chebyshev(Mean, Sd) UCL	11.37

Data appear Normal (0.05)
May want to try Normal UCLs

Arsenic

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	2.36
Maximum	9.62
Mean	5.813
Median	4.63
SD	3.107
Variance	9.653
Coefficient of Variation	0.534
Skewness	0.351
Mean of log data	1.623
SD of log data	0.566

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**7.739**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	7.646

95% Modified-t UCL	7.759
Non-Parametric UCLs	
95% CLT UCL	7.517
95% Jackknife UCL	7.739
95% Standard Bootstrap UCL	7.405
95% Bootstrap-t UCL	8.015
95% Hall's Bootstrap UCL	7.142
95% Percentile Bootstrap UCL	7.431
95% BCA Bootstrap UCL	7.597
95% Chebyshev(Mean, Sd) UCL	10.33
97.5% Chebyshev(Mean, Sd) UCL	12.28
99% Chebyshev(Mean, Sd) UCL	16.12

Data appear Normal (0.05)
May want to try Normal UCLs

Barium

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	111
Maximum	280
Mean	209.7
Median	201
SD	47.73
Variance	2278
Coefficient of Variation	0.228
Skewness	-0.775
Mean of log data	5.318
SD of log data	0.263

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**239.2**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	231.4
95% Modified-t UCL	238.6
Non-Parametric UCLs	
95% CLT UCL	235.8
95% Jackknife UCL	239.2
95% Standard Bootstrap UCL	234.1
95% Bootstrap-t UCL	235.4
95% Hall's Bootstrap UCL	235.3
95% Percentile Bootstrap UCL	233.7
95% BCA Bootstrap UCL	231.4
95% Chebyshev(Mean, Sd) UCL	279
97.5% Chebyshev(Mean, Sd) UCL	309
99% Chebyshev(Mean, Sd) UCL	368

Data appear Normal (0.05)
May want to try Normal UCLs

Benzo(b)fluoranthene

Total Number of Data	9
Number of Non-Detect Data	8
Number of Detected Data	**1**
Minimum Detected	0.0369
Maximum Detected	0.0369
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.00909
Maximum Non-detect	0.0115

Data set has all detected values equal to = 0.0369, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0369

**** Instead of UCL, EPC is selected to be median = <0.0109**
[per recommendation in ProUCL User Guide]

Beryllium

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	0.32
Maximum	1.32
Mean	0.766
Median	0.69
SD	0.403
Variance	0.163
Coefficient of Variation	0.527
Skewness	0.315
Mean of log data	-0.403
SD of log data	0.566

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**1.016**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	1.002
95% Modified-t UCL	1.018
Non-Parametric UCLs	
95% CLT UCL	0.987
95% Jackknife UCL	1.016
95% Standard Bootstrap UCL	0.975
95% Bootstrap-t UCL	1.053
95% Hall's Bootstrap UCL	0.946
95% Percentile Bootstrap UCL	0.977
95% BCA Bootstrap UCL	0.981
95% Chebyshev(Mean, Sd) UCL	1.351
97.5% Chebyshev(Mean, Sd) UCL	1.605
99% Chebyshev(Mean, Sd) UCL	2.103

Data appear Normal (0.05)
May want to try Normal UCLs

Boron

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	13.3
Maximum	47.9
Mean	27.64
Median	26
SD	12.82
Variance	164.2
Coefficient of Variation	0.464
Skewness	0.532
Mean of log data	3.222
SD of log data	0.472

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**35.59**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	35.48
95% Modified-t UCL	35.71
Non-Parametric UCLs	
95% CLT UCL	34.67
95% Jackknife UCL	35.59
95% Standard Bootstrap UCL	34.23
95% Bootstrap-t UCL	36.73
95% Hall's Bootstrap UCL	35.45
95% Percentile Bootstrap UCL	34.46
95% BCA Bootstrap UCL	35.3
95% Chebyshev(Mean, Sd) UCL	46.26
97.5% Chebyshev(Mean, Sd) UCL	54.32
99% Chebyshev(Mean, Sd) UCL	70.15

Data appear Normal (0.05)
May want to try Normal UCLs

Carbon disulfide

Total Number of Data	9
Number of Non-Detect Data	7
Number of Detected Data	**2**
Minimum Detected	0.00341
Maximum Detected	0.00841
Percent Non-Detects	**77.78%**
Minimum Non-detect	1.76E-04
Maximum Non-detect	0.0017
Mean of Detected Data	0.00591
Median of Detected Data	0.00591
Variance of Detected Data	1.25E-05
SD of Detected Data	0.00354
CV of Detected Data	0.598

Skewness of Detected Data	N/A
Mean of Detected log data	-5.23
SD of Detected Log data	0.638

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00397
SD	0.00157
Standard Error of Mean	7.41E-04
95% KM (t) UCL	0.00534
95% KM (z) UCL	0.00518
95% KM (BCA) UCL	0.00841
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.00719
97.5% KM (Chebyshev) UCL	0.00859
99% KM (Chebyshev) UCL	0.0113
Potential UCL to Use	
95% KM (t) UCL	0.00534
95% KM (% Bootstrap) UCL	N/A

**** Instead of UCL, EPC is selected to be median = <0.000810**
[per recommendation in ProUCL User Guide]

Chromium

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	5.81
Maximum	22.5
Mean	12.81
Median	11.1
SD	6.512
Variance	42.41
Coefficient of Variation	0.508
Skewness	0.444
Mean of log data	2.43
SD of log data	0.527

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**16.85**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	16.73
95% Modified-t UCL	16.9
Non-Parametric UCLs	
95% CLT UCL	16.38
95% Jackknife UCL	16.85
95% Standard Bootstrap UCL	16.23
95% Bootstrap-t UCL	17.33
95% Hall's Bootstrap UCL	16.09
95% Percentile Bootstrap UCL	16.17
95% BCA Bootstrap UCL	16.4
95% Chebyshev(Mean, Sd) UCL	22.28
97.5% Chebyshev(Mean, Sd) UCL	26.37
99% Chebyshev(Mean, Sd) UCL	34.41

Data appear Normal (0.05)
May want to try Normal UCLs

cis-1,2-Dichloroethene

Total Number of Data	9
Number of Non-Detect Data	8
Number of Detected Data	1
Minimum Detected	0.0284
Maximum Detected	0.0284
Percent Non-Detects	88.89%
Minimum Non-detect	0.000204
Maximum Non-detect	0.00196

Data set has all detected values equal to = 0.0284, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0284

**** Instead of UCL, EPC is selected to be median = <0.000461**
[per recommendation in ProUCL User Guide]

Cobalt

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	3.32
Maximum	11.8
Mean	6.698
Median	5.92
SD	3.165
Variance	10.02
Coefficient of Variation	0.473
Skewness	0.508
Mean of log data	1.8

SD of log data	0.481

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**8.66**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	8.624
95% Modified-t UCL	8.69
Non-Parametric UCLs	
95% CLT UCL	8.433
95% Jackknife UCL	8.66
95% Standard Bootstrap UCL	8.334
95% Bootstrap-t UCL	8.982
95% Hall's Bootstrap UCL	8.445
95% Percentile Bootstrap UCL	8.349
95% BCA Bootstrap UCL	8.547
95% Chebyshev(Mean, Sd) UCL	11.3
97.5% Chebyshev(Mean, Sd) UCL	13.29
99% Chebyshev(Mean, Sd) UCL	17.2

Data appear Normal (0.05)
May want to try Normal UCLs

Copper

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	2.68
Maximum	16.8
Mean	8.138
Median	6.87
SD	5.165
Variance	26.67
Coefficient of Variation	0.635
Skewness	0.626
Mean of log data	1.902
SD of log data	0.676

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**11.34**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	11.35
95% Modified-t UCL	11.4
Non-Parametric UCLs	
95% CLT UCL	10.97
95% Jackknife UCL	11.34
95% Standard Bootstrap UCL	10.78

95% Bootstrap-t UCL	11.68
95% Hall's Bootstrap UCL	11.18
95% Percentile Bootstrap UCL	11.05
95% BCA Bootstrap UCL	11.25
95% Chebyshev(Mean, Sd) UCL	15.64
97.5% Chebyshev(Mean, Sd) UCL	18.89
99% Chebyshev(Mean, Sd) UCL	25.27

Data appear Normal (0.05)
May want to try Normal UCLs

Iron

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	7440
Maximum	27900
Mean	16496
Median	15000
SD	8097
Variance	65563178
Coefficient of Variation	0.491
Skewness	0.325
Mean of log data	9.596
SD of log data	0.518

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**21515**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	21247
95% Modified-t UCL	21563
Non-Parametric UCLs	
95% CLT UCL	20935
95% Jackknife UCL	21515
95% Standard Bootstrap UCL	20708
95% Bootstrap-t UCL	22126
95% Hall's Bootstrap UCL	19940
95% Percentile Bootstrap UCL	20869
95% BCA Bootstrap UCL	21036
95% Chebyshev(Mean, Sd) UCL	28260
97.5% Chebyshev(Mean, Sd) UCL	33351
99% Chebyshev(Mean, Sd) UCL	43351

Data appear Normal (0.05)
May want to try Normal UCLs

Lead

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	5.34
Maximum	14.5

Mean	9.587
Median	9.2
SD	3.603
Variance	12.98
Coefficient of Variation	0.376
Skewness	0.161
Mean of log data	2.194
SD of log data	0.393

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**11.82**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	11.63
95% Modified-t UCL	11.83

Non-Parametric UCLs	
95% CLT UCL	11.56
95% Jackknife UCL	11.82
95% Standard Bootstrap UCL	11.44
95% Bootstrap-t UCL	11.9
95% Hall's Bootstrap UCL	11.24
95% Percentile Bootstrap UCL	11.42
95% BCA Bootstrap UCL	11.65
95% Chebyshev(Mean, Sd) UCL	14.82
97.5% Chebyshev(Mean, Sd) UCL	17.09
99% Chebyshev(Mean, Sd) UCL	21.54

Data appear Normal (0.05)
May want to try Normal UCLs

Lithium

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	7.29
Maximum	44.6
Mean	21.4
Median	17.1
SD	14.41
Variance	207.6
Coefficient of Variation	0.673
Skewness	0.724
Mean of log data	2.852
SD of log data	0.697

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**30.33**

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	30.54
95% Modified-t UCL	30.52

Non-Parametric UCLs	
95% CLT UCL	29.3
95% Jackknife UCL	30.33
95% Standard Bootstrap UCL	28.78
95% Bootstrap-t UCL	33.66
95% Hall's Bootstrap UCL	30.44
95% Percentile Bootstrap UCL	29
95% BCA Bootstrap UCL	29.67
95% Chebyshev(Mean, Sd) UCL	42.33
97.5% Chebyshev(Mean, Sd) UCL	51.39
99% Chebyshev(Mean, Sd) UCL	69.18

Data appear Normal (0.05)
May want to try Normal UCLs

Manganese

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	212
Maximum	442
Mean	330.7
Median	321
SD	88.99
Variance	7920
Coefficient of Variation	0.269
Skewness	-0.147
Mean of log data	5.767
SD of log data	0.284

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**385.8**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	377.9
95% Modified-t UCL	385.6

Non-Parametric UCLs	
95% CLT UCL	379.5
95% Jackknife UCL	385.8
95% Standard Bootstrap UCL	376.3
95% Bootstrap-t UCL	385.8
95% Hall's Bootstrap UCL	371.9
95% Percentile Bootstrap UCL	376.9
95% BCA Bootstrap UCL	373.4
95% Chebyshev(Mean, Sd) UCL	460
97.5% Chebyshev(Mean, Sd) UCL	515.9
99% Chebyshev(Mean, Sd) UCL	625.8

Data appear Normal (0.05)
May want to try Normal UCLs

Mercury

Number of Valid Observations	9
Number of Distinct Observations	8
Minimum	0.0065
Maximum	0.05
Mean	0.0176
Median	0.016
SD	0.0132
Variance	1.75E-04
Coefficient of Variation	0.753
Skewness	2.163
Mean of log data	-4.227
SD of log data	0.613

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	0.0258
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	0.0282
95% Modified-t UCL	0.0263
Non-Parametric UCLs	
95% CLT UCL	0.0248
95% Jackknife UCL	0.0258
95% Standard Bootstrap UCL	0.0247
95% Bootstrap-t UCL	0.0349
95% Hall's Bootstrap UCL	0.0567
95% Percentile Bootstrap UCL	0.025
95% BCA Bootstrap UCL	0.0277
95% Chebyshev(Mean, Sd) UCL	**0.0368**
97.5% Chebyshev(Mean, Sd) UCL	0.0452
99% Chebyshev(Mean, Sd) UCL	0.0615

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Molybdenum

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	0.16
Maximum	0.35
Mean	0.241
Median	0.24
SD	0.0675
Variance	0.00456
Coefficient of Variation	0.28
Skewness	0.35
Mean of log data	-1.458
SD of log data	0.282

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**0.283**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	0.281
95% Modified-t UCL	0.283
Non-Parametric UCLs	
95% CLT UCL	0.278
95% Jackknife UCL	0.283
95% Standard Bootstrap UCL	0.277
95% Bootstrap-t UCL	0.287
95% Hall's Bootstrap UCL	0.276
95% Percentile Bootstrap UCL	0.276
95% BCA Bootstrap UCL	0.276
95% Chebyshev(Mean, Sd) UCL	0.339
97.5% Chebyshev(Mean, Sd) UCL	0.382
99% Chebyshev(Mean, Sd) UCL	0.465

Data appear Normal (0.05)
May want to try Normal UCLs

Nickel

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	6.31
Maximum	27.3
Mean	14.91
Median	13
SD	8.111
Variance	65.79
Coefficient of Variation	0.544
Skewness	0.452
Mean of log data	2.562
SD of log data	0.571

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**19.94**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	19.79
95% Modified-t UCL	20.01
Non-Parametric UCLs	
95% CLT UCL	19.36
95% Jackknife UCL	19.94
95% Standard Bootstrap UCL	19.13
95% Bootstrap-t UCL	20.56
95% Hall's Bootstrap UCL	19.13
95% Percentile Bootstrap UCL	19.09
95% BCA Bootstrap UCL	19.63

95% Chebyshev(Mean, Sd) UCL	26.7
97.5% Chebyshev(Mean, Sd) UCL	31.8
99% Chebyshev(Mean, Sd) UCL	41.81

Data appear Normal (0.05)
May want to try Normal UCLs

Strontium

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	34.8
Maximum	87.4
Mean	59.17
Median	59.3
SD	22.06
Variance	486.7
Coefficient of Variation	0.373
Skewness	0.141
Mean of log data	4.015
SD of log data	0.388

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**72.84**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	71.63
95% Modified-t UCL	72.9
Non-Parametric UCLs	
95% CLT UCL	71.26
95% Jackknife UCL	72.84
95% Standard Bootstrap UCL	70.42
95% Bootstrap-t UCL	73.24
95% Hall's Bootstrap UCL	68.5
95% Percentile Bootstrap UCL	70.59
95% BCA Bootstrap UCL	70.8
95% Chebyshev(Mean, Sd) UCL	91.22
97.5% Chebyshev(Mean, Sd) UCL	105.1
99% Chebyshev(Mean, Sd) UCL	132.3

Data appear Normal (0.05)
May want to try Normal UCLs

Titanium

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	21.1
Maximum	54.5
Mean	31.79
Median	28.6
SD	10.49
Variance	110

Coefficient of Variation	0.33
Skewness	1.471
Mean of log data	3.417
SD of log data	0.297

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**38.29**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	39.37
95% Modified-t UCL	38.58
Non-Parametric UCLs	
95% CLT UCL	37.54
95% Jackknife UCL	38.29
95% Standard Bootstrap UCL	37.28
95% Bootstrap-t UCL	44.61
95% Hall's Bootstrap UCL	71.75
95% Percentile Bootstrap UCL	37.58
95% BCA Bootstrap UCL	39.1
95% Chebyshev(Mean, Sd) UCL	47.03
97.5% Chebyshev(Mean, Sd) UCL	53.62
99% Chebyshev(Mean, Sd) UCL	66.58

Data appear Normal (0.05)
May want to try Normal UCLs

Trichloroethene

Total Number of Data	9
Number of Non-Detect Data	8
Number of Detected Data	**1**
Minimum Detected	0.0159
Maximum Detected	0.0159
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.000286
Maximum Non-detect	0.00276

Data set has all detected values equal to = 0.0159, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0159

**** Instead of UCL, EPC is selected to be median = <0.000647**
[per recommendation in ProUCL User Guide]

Vanadium

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	10.2
Maximum	34.2
Mean	20.21
Median	19.1

SD	9.135
Variance	83.45
Coefficient of Variation	0.452
Skewness	0.468
Mean of log data	2.913
SD of log data	0.461

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**25.87**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	25.73
95% Modified-t UCL	25.95
Non-Parametric UCLs	
95% CLT UCL	25.22
95% Jackknife UCL	25.87
95% Standard Bootstrap UCL	24.81
95% Bootstrap-t UCL	26.97
95% Hall's Bootstrap UCL	25.22
95% Percentile Bootstrap UCL	24.93
95% BCA Bootstrap UCL	25
95% Chebyshev(Mean, Sd) UCL	33.48
97.5% Chebyshev(Mean, Sd) UCL	39.23
99% Chebyshev(Mean, Sd) UCL	50.51

Data appear Normal (0.05)
May want to try Normal UCLs

Xylene (total)

Total Number of Data	9
Number of Non-Detect Data	8
Number of Detected Data	**1**
Minimum Detected	0.00335
Maximum Detected	0.00335
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.000925
Maximum Non-detect	0.00891

Data set has all detected values equal to = 0.00335, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00335

**** Instead of UCL, EPC is selected to be median = <0.00209**
[per recommendation in ProUCL User Guide]

Zinc

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	19.3
Maximum	54.1

Mean	36.04
Median	34.1
SD	13.68
Variance	187
Coefficient of Variation	0.379
Skewness	0.0735
Mean of log data	3.515
SD of log data	0.404

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**44.52**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	43.66
95% Modified-t UCL	44.54
Non-Parametric UCLs	
95% CLT UCL	43.54
95% Jackknife UCL	44.52
95% Standard Bootstrap UCL	43.06
95% Bootstrap-t UCL	44.65
95% Hall's Bootstrap UCL	42.22
95% Percentile Bootstrap UCL	43.54
95% BCA Bootstrap UCL	43.28
95% Chebyshev(Mean, Sd) UCL	55.91
97.5% Chebyshev(Mean, Sd) UCL	64.51
99% Chebyshev(Mean, Sd) UCL	81.4

Data appear Normal (0.05)
May want to try Normal UCLs

APPENDIX A-8

NORTH OF MARLIN SEDIMENT

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options		
From File	C:\Users\Michael\....\Gulfco Superfund Site\revised HHRA\N Wetland-May09 data\Gulfco N Wetland-May09 data_ProUCL input.wst	
Full Precision	OFF	
Confidence Coefficient	95%	
Number of Bootstrap Operations	2000	

1,2-Dichloroethane

Total Number of Data	48
Number of Non-Detect Data	45
Number of Detected Data	**3**
Minimum Detected	0.00183
Maximum Detected	0.0024
Percent Non-Detects	**93.75%**
Minimum Non-detect	1.23E-04
Maximum Non-detect	0.00265
Mean of Detected Data	0.00218
Median of Detected Data	0.00232
Variance of Detected Data	9.52E-08
SD of Detected Data	3.09E-04
CV of Detected Data	0.141
Skewness of Detected Data	-1.602
Mean of Detected log data	-6.134
SD of Detected Log data	0.148

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	48
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00185
SD	1.07E-04

Standard Error of Mean	1.92E-05
95% KM (t) UCL	0.00188
95% KM (z) UCL	0.00188
95% KM (BCA) UCL	0.0024
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.00194
97.5% KM (Chebyshev) UCL	0.00197
99% KM (Chebyshev) UCL	0.00204

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median <0.00015**
[per recommendation in ProUCL User Guide]

2-Methylnaphthalene

Total Number of Data	48
Number of Non-Detect Data	44
Number of Detected Data	**4**
Minimum Detected	0.0122
Maximum Detected	0.43
Percent Non-Detects	**91.67%**
Minimum Non-detect	0.00851
Maximum Non-detect	0.173
Mean of Detected Data	0.134
Median of Detected Data	0.0463
Variance of Detected Data	0.0393
SD of Detected Data	0.198
CV of Detected Data	1.483
Skewness of Detected Data	1.956
Mean of Detected log data	-2.854
SD of Detected Log data	1.483

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	47
Number treated as Detected	1
Single DL Percent Detection	97.92%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0225
SD	0.0599
Standard Error of Mean	0.00999
95% KM (t) UCL	0.0393
95% KM (z) UCL	0.039
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0661
97.5% KM (Chebyshev) UCL	0.0849
99% KM (Chebyshev) UCL	0.122

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median <0.01200**
[per recommendation in ProUCL User Guide]

4,4'-DDT

Total Number of Data	56
Number of Non-Detect Data	40
Number of Detected Data	**16**
Minimum Detected	9.29E-04
Maximum Detected	0.00922
Percent Non-Detects	**71.43%**
Minimum Non-detect	1.54E-04
Maximum Non-detect	0.00498

Mean of Detected Data	0.00254
Median of Detected Data	0.00192
Variance of Detected Data	4.33E-06
SD of Detected Data	0.00208
CV of Detected Data	0.821
Skewness of Detected Data	2.555
Mean of Detected log data	-6.177
SD of Detected Log data	0.594

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	55
Number treated as Detected	1
Single DL Percent Detection	98.21%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00139
SD	0.0013
Standard Error of Mean	1.80E-04
95% KM (t) UCL	0.0017
95% KM (z) UCL	0.00169
95% KM (BCA) UCL	0.00198
95% KM (Percentile Bootstrap) UCL	0.00184
95% KM (Chebyshev) UCL	0.00218
97.5% KM (Chebyshev) UCL	**0.00252**
99% KM (Chebyshev) UCL	0.00319

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Acenaphthene

Total Number of Data	48
Number of Non-Detect Data	44
Number of Detected Data	**4**
Minimum Detected	0.016
Maximum Detected	0.133
Percent Non-Detects	**91.67%**
Minimum Non-detect	0.00851
Maximum Non-detect	0.173

Mean of Detected Data	0.0748
Median of Detected Data	0.075
Variance of Detected Data	0.00324
SD of Detected Data	0.057
CV of Detected Data	0.762
Skewness of Detected Data	-0.0107
Mean of Detected log data	-2.907
SD of Detected Log data	0.997

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	48
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0213
SD	0.0224
Standard Error of Mean	0.00387
95% KM (t) UCL	0.0278
95% KM (z) UCL	0.0277
95% KM (BCA) UCL	0.133
95% KM (Percentile Bootstrap) UCL	0.114
95% KM (Chebyshev) UCL	0.0382
97.5% KM (Chebyshev) UCL	0.0455
99% KM (Chebyshev) UCL	0.0598

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median** **<0.01105**
[per recommendation in ProUCL User Guide]

Acenaphthylene

Total Number of Data	48
Number of Non-Detect Data	44
Number of Detected Data	**4**
Minimum Detected	0.0291
Maximum Detected	0.545
Percent Non-Detects	**91.67%**
Minimum Non-detect	0.00746
Maximum Non-detect	0.174

Mean of Detected Data	0.265
Median of Detected Data	0.243
Variance of Detected Data	0.0522
SD of Detected Data	0.228
CV of Detected Data	0.863
Skewness of Detected Data	0.418
Mean of Detected log data	-1.795
SD of Detected Log data	1.293

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	46
Number treated as Detected	2
Single DL Percent Detection	95.83%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0488
SD	0.0866
Standard Error of Mean	0.0144
95% KM (t) UCL	0.073
95% KM (z) UCL	0.0726
95% KM (BCA) UCL	0.545
95% KM (Percentile Bootstrap) UCL	0.545
95% KM (Chebyshev) UCL	0.112
97.5% KM (Chebyshev) UCL	0.139
99% KM (Chebyshev) UCL	0.193

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median <0.01270**
[per recommendation in ProUCL User Guide]

Aluminum

Number of Valid Observations	48
Number of Distinct Observations	38
Minimum	3400
Maximum	19200
Mean	13229
Median	13650
SD	3162
Variance	9999496
Coefficient of Variation	0.239
Skewness	-0.611
Mean of log data	9.454
SD of log data	0.296

95% Useful UCLs	
Student's-t UCL	**13995**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	13936

95% Modified-t UCL	13988

Non-Parametric UCLs	
95% CLT UCL	13980
95% Jackknife UCL	13995
95% Standard Bootstrap UCL	13984
95% Bootstrap-t UCL	13961
95% Hall's Bootstrap UCL	13944
95% Percentile Bootstrap UCL	13956
95% BCA Bootstrap UCL	13934
95% Chebyshev(Mean, Sd) UCL	15218
97.5% Chebyshev(Mean, Sd) UCL	16079
99% Chebyshev(Mean, Sd) UCL	17770

Data appear Normal (0.05)
May want to try Normal UCLs

Anthracene

Total Number of Data	48
Number of Non-Detect Data	40
Number of Detected Data	**8**
Minimum Detected	0.00838
Maximum Detected	0.334
Percent Non-Detects	**83.33%**
Minimum Non-detect	0.00593
Maximum Non-detect	0.12

Mean of Detected Data	0.137
Median of Detected Data	0.111
Variance of Detected Data	0.0176
SD of Detected Data	0.133
CV of Detected Data	0.972
Skewness of Detected Data	0.321
Mean of Detected log data	-2.761
SD of Detected Log data	1.525

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	44
Number treated as Detected	4
Single DL Percent Detection	91.67%

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0299
SD	0.0696
Standard Error of Mean	0.0107
95% KM (t) UCL	0.0479
95% KM (z) UCL	0.0476
95% KM (BCA) UCL	0.0746
95% KM (Percentile Bootstrap) UCL	0.0547
95% KM (Chebyshev) UCL	0.0767
97.5% KM (Chebyshev) UCL	**0.097**
99% KM (Chebyshev) UCL	0.137

Data appear Normal (0.05)
May want to try Normal UCLs

Antimony

Total Number of Data	47
Number of Non-Detect Data	8
Number of Detected Data	**39**
Minimum Detected	0.65
Maximum Detected	4.24
Percent Non-Detects	**17.02%**
Minimum Non-detect	0.24
Maximum Non-detect	0.26
Mean of Detected Data	1.365
Median of Detected Data	1.25
Variance of Detected Data	0.366
SD of Detected Data	0.605
CV of Detected Data	0.443
Skewness of Detected Data	3.054
Mean of Detected log data	0.245
SD of Detected Log data	0.347

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	0.347
Mean	1.124
SD	0.317

95% Winsor (t) UCL	1.203

Kaplan Meier (KM) Method	
Mean	1.243
SD	0.607
Standard Error of Mean	0.0897
95% KM (t) UCL	1.394
95% KM (z) UCL	1.391
95% KM (BCA) UCL	1.417
95% KM (Percentile Bootstrap) UCL	1.411
95% KM (Chebyshev) UCL	1.634
97.5% KM (Chebyshev) UCL	**1.803**
99% KM (Chebyshev) UCL	2.136

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Arsenic

Total Number of Data	48
Number of Non-Detect Data	15
Number of Detected Data	**33**
Minimum Detected	1
Maximum Detected	12.8
Percent Non-Detects	**31.25%**
Minimum Non-detect	0.12
Maximum Non-detect	1.55

Mean of Detected Data	3.58
Median of Detected Data	2.83
Variance of Detected Data	5.289
SD of Detected Data	2.3
CV of Detected Data	0.642
Skewness of Detected Data	2.191
Mean of Detected log data	1.114
SD of Detected Log data	0.569

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	19
Number treated as Detected	29
Single DL Percent Detection	39.58%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	39.58%
Mean	2.191
SD	0.434

95% Winsor (t) UCL	2.306

Kaplan Meier (KM) Method	
Mean	2.775
SD	2.226
Standard Error of Mean	0.326
95% KM (t) UCL	3.322
95% KM (z) UCL	3.312
95% KM (BCA) UCL	3.433
95% KM (Percentile Bootstrap) UCL	3.376
95% KM (Chebyshev) UCL	4.197
97.5% KM (Chebyshev) UCL	**4.812**
99% KM (Chebyshev) UCL	6.021

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Barium

Number of Valid Observations	48
Number of Distinct Observations	46
Minimum	36
Maximum	820
Mean	151.7
Median	102.5
SD	136.5
Variance	18624
Coefficient of Variation	0.899
Skewness	3.09
Mean of log data	4.792
SD of log data	0.623

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	184.8
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	193.5
95% Modified-t UCL	186.2
Non-Parametric UCLs	
95% CLT UCL	184.1
95% Jackknife UCL	184.8
95% Standard Bootstrap UCL	184.1
95% Bootstrap-t UCL	203.7
95% Hall's Bootstrap UCL	214.8
95% Percentile Bootstrap UCL	185.5
95% BCA Bootstrap UCL	197.5
95% Chebyshev(Mean, Sd) UCL	237.6

97.5% Chebyshev(Mean, Sd) UCL	274.7
99% Chebyshev(Mean, Sd) UCL	347.7

Potential UCL to Use
Use 95% Chebyshev (Mean, Sd) UCL **237.6**

Benzo(a)anthracene

Total Number of Data	48
Number of Non-Detect Data	43
Number of Detected Data	**5**
Minimum Detected	0.0546
Maximum Detected	0.993
Percent Non-Detects	**89.58%**
Minimum Non-detect	0.00506
Maximum Non-detect	0.142
Mean of Detected Data	0.413
Median of Detected Data	0.199
Variance of Detected Data	0.177
SD of Detected Data	0.421
CV of Detected Data	1.019
Skewness of Detected Data	0.765
Mean of Detected log data	-1.442
SD of Detected Log data	1.258

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	45
Number treated as Detected	3
Single DL Percent Detection	93.75%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.092
SD	0.164
Standard Error of Mean	0.0264
95% KM (t) UCL	0.136
95% KM (z) UCL	0.135

95% KM (BCA) UCL	0.724
95% KM (Percentile Bootstrap) UCL	0.254
95% KM (Chebyshev) UCL	0.207
97.5% KM (Chebyshev) UCL	0.257
99% KM (Chebyshev) UCL	0.355

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median <0.01135**
[per recommendation in ProUCL User Guide]

Benzo(a)pyrene

Total Number of Data	48
Number of Non-Detect Data	33
Number of Detected Data	**15**
Minimum Detected	0.0176
Maximum Detected	1.3
Percent Non-Detects	**68.75%**
Minimum Non-detect	0.00862
Maximum Non-detect	0.132

Mean of Detected Data	0.313
Median of Detected Data	0.133
Variance of Detected Data	0.157
SD of Detected Data	0.397
CV of Detected Data	1.269
Skewness of Detected Data	1.521
Mean of Detected log data	-2.11
SD of Detected Log data	1.557

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	39
Number treated as Detected	9
Single DL Percent Detection	81.25%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.11
SD	0.254
Standard Error of Mean	0.038
95% KM (t) UCL	0.173
95% KM (z) UCL	0.172

95% KM (BCA) UCL	0.178
95% KM (Percentile Bootstrap) UCL	0.178
95% KM (Chebyshev) UCL	0.275
97.5% KM (Chebyshev) UCL	**0.347**
99% KM (Chebyshev) UCL	0.487

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Benzo(b)fluoranthene

Total Number of Data	48
Number of Non-Detect Data	29
Number of Detected Data	**19**
Minimum Detected	0.0162
Maximum Detected	1.36
Percent Non-Detects	**60.42%**
Minimum Non-detect	0.00754
Maximum Non-detect	0.153
Mean of Detected Data	0.206
Median of Detected Data	0.0474
Variance of Detected Data	0.123
SD of Detected Data	0.35
CV of Detected Data	1.697
Skewness of Detected Data	2.497
Mean of Detected log data	-2.563
SD of Detected Log data	1.342

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	42
Number treated as Detected	6
Single DL Percent Detection	87.50%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0923
SD	0.233
Standard Error of Mean	0.0346
95% KM (t) UCL	0.15
95% KM (z) UCL	0.149
95% KM (BCA) UCL	0.159
95% KM (Percentile Bootstrap) UCL	0.152
95% KM (Chebyshev) UCL	0.243

97.5% KM (Chebyshev) UCL	0.309
99% KM (Chebyshev) UCL	0.437

Potential UCL to Use	
95% KM (BCA) UCL	**0.159**

Benzo(g,h,i)perylene

Total Number of Data	48
Number of Non-Detect Data	24
Number of Detected Data	**24**
Minimum Detected	0.044
Maximum Detected	1.94
Percent Non-Detects	**50.00%**
Minimum Non-detect	0.00863
Maximum Non-detect	0.644

Mean of Detected Data	0.365
Median of Detected Data	0.144
Variance of Detected Data	0.244
SD of Detected Data	0.494
CV of Detected Data	1.355
Skewness of Detected Data	2.159
Mean of Detected log data	-1.648
SD of Detected Log data	1.076

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	43
Number treated as Detected	5
Single DL Percent Detection	89.58%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.206
SD	0.377
Standard Error of Mean	0.0557
95% KM (t) UCL	0.3
95% KM (z) UCL	0.298
95% KM (BCA) UCL	0.331
95% KM (Percentile Bootstrap) UCL	0.302
95% KM (Chebyshev) UCL	0.449
97.5% KM (Chebyshev) UCL	0.554
99% KM (Chebyshev) UCL	0.76

Potential UCL to Use	
95% KM (Chebyshev) UCL	**0.449**

Benzo(k)fluoranthene

Total Number of Data	48
Number of Non-Detect Data	34
Number of Detected Data	**14**
Minimum Detected	0.0692
Maximum Detected	0.73
Percent Non-Detects	**70.83%**
Minimum Non-detect	0.01
Maximum Non-detect	0.216
Mean of Detected Data	0.174
Median of Detected Data	0.128
Variance of Detected Data	0.0312
SD of Detected Data	0.177
CV of Detected Data	1.013
Skewness of Detected Data	2.806
Mean of Detected log data	-2.016
SD of Detected Log data	0.67

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	46
Number treated as Detected	2
Single DL Percent Detection	95.83%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.101
SD	0.104
Standard Error of Mean	0.0156
95% KM (t) UCL	0.127
95% KM (z) UCL	0.127
95% KM (BCA) UCL	0.135
95% KM (Percentile Bootstrap) UCL	0.131
95% KM (Chebyshev) UCL	0.169
97.5% KM (Chebyshev) UCL	0.198
99% KM (Chebyshev) UCL	0.256

Potential UCL to Use	
95% KM (t) UCL	0.127
95% KM (% Bootstrap) UCL	**0.131**

Beryllium

Number of Valid Observations	48
Number of Distinct Observations	36
Minimum	0.28
Maximum	1.37
Mean	0.894
Median	0.93
SD	0.206
Variance	0.0424
Coefficient of Variation	0.23
Skewness	-0.364
Mean of log data	-0.144
SD of log data	0.269

95% Useful UCLs	
Student's-t UCL	**0.943**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	0.941
95% Modified-t UCL	0.943

Non-Parametric UCLs	
95% CLT UCL	0.942
95% Jackknife UCL	0.943
95% Standard Bootstrap UCL	0.942
95% Bootstrap-t UCL	0.944
95% Hall's Bootstrap UCL	0.942
95% Percentile Bootstrap UCL	0.941
95% BCA Bootstrap UCL	0.942
95% Chebyshev(Mean, Sd) UCL	1.023
97.5% Chebyshev(Mean, Sd) UCL	1.079
99% Chebyshev(Mean, Sd) UCL	1.189

Data appear Normal (0.05)
May want to try Normal UCLs

Boron

Total Number of Data	48
Number of Non-Detect Data	23
Number of Detected Data	**25**
Minimum Detected	5.17
Maximum Detected	46.2
Percent Non-Detects	**47.92%**
Minimum Non-detect	1.16
Maximum Non-detect	40.9

Mean of Detected Data	22.7
Median of Detected Data	20.4
Variance of Detected Data	118.8
SD of Detected Data	10.9
CV of Detected Data	0.48
Skewness of Detected Data	0.557
Mean of Detected log data	2.997
SD of Detected Log data	0.54

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	46
Number treated as Detected	2
Single DL Percent Detection	95.83%

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	15.27
SD	11.35
Standard Error of Mean	1.729
95% KM (t) UCL	18.17
95% KM (z) UCL	18.12
95% KM (BCA) UCL	20.12
95% KM (Percentile Bootstrap) UCL	19.07
95% KM (Chebyshev) UCL	22.81
97.5% KM (Chebyshev) UCL	**26.07**
99% KM (Chebyshev) UCL	32.48

Data appear Normal (0.05)
May want to try Normal UCLs

Cadmium

Total Number of Data	48
Number of Non-Detect Data	29
Number of Detected Data	**19**
Minimum Detected	0.033
Maximum Detected	0.48
Percent Non-Detects	**60.42%**
Minimum Non-detect	0.0058
Maximum Non-detect	0.039

Mean of Detected Data	0.243
Median of Detected Data	0.23
Variance of Detected Data	0.0216

SD of Detected Data	0.147
CV of Detected Data	0.606
Skewness of Detected Data	0.272
Mean of Detected log data	-1.645
SD of Detected Log data	0.761

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	30
Number treated as Detected	18
Single DL Percent Detection	62.50%

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.116
SD	0.136
Standard Error of Mean	0.0202
95% KM (t) UCL	0.15
95% KM (z) UCL	0.149
95% KM (BCA) UCL	0.175
95% KM (Percentile Bootstrap) UCL	0.167
95% KM (Chebyshev) UCL	0.204
97.5% KM (Chebyshev) UCL	**0.242**
99% KM (Chebyshev) UCL	0.317

Data appear Normal (0.05)
May want to try Normal UCLs

Carbazole

Total Number of Data	48
Number of Non-Detect Data	43
Number of Detected Data	**5**
Minimum Detected	0.0158
Maximum Detected	0.141
Percent Non-Detects	**89.58%**
Minimum Non-detect	0.00812
Maximum Non-detect	0.165

Mean of Detected Data	0.0644
Median of Detected Data	0.0262
Variance of Detected Data	0.00376
SD of Detected Data	0.0613
CV of Detected Data	0.952
Skewness of Detected Data	0.651

Mean of Detected log data	-3.176
SD of Detected Log data	1.059

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	48
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0212
SD	0.0238
Standard Error of Mean	0.00397
95% KM (t) UCL	0.0279
95% KM (z) UCL	0.0278
95% KM (BCA) UCL	0.141
95% KM (Percentile Bootstrap) UCL	0.0362
95% KM (Chebyshev) UCL	0.0385
97.5% KM (Chebyshev) UCL	0.046
99% KM (Chebyshev) UCL	0.0607

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median** **<0.01100**
[per recommendation in ProUCL User Guide]

Carbon disulfide

Total Number of Data	48
Number of Non-Detect Data	44
Number of Detected Data	**4**
Minimum Detected	0.00334
Maximum Detected	0.00699
Percent Non-Detects	**91.67%**
Minimum Non-detect	1.18E-04
Maximum Non-detect	0.00253

Mean of Detected Data	0.00507
Median of Detected Data	0.00497
Variance of Detected Data	2.23E-06
SD of Detected Data	0.00149
CV of Detected Data	0.295
Skewness of Detected Data	0.389
Mean of Detected log data	-5.318
SD of Detected Log data	0.302

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00348
SD	6.06E-04
Standard Error of Mean	1.01E-04
95% KM (t) UCL	0.00365
95% KM (z) UCL	0.00365
95% KM (BCA) UCL	0.00699
95% KM (Percentile Bootstrap) UCL	0.00513
95% KM (Chebyshev) UCL	0.00392
97.5% KM (Chebyshev) UCL	0.00411
99% KM (Chebyshev) UCL	0.00449

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median** **<0.00014**
[per recommendation in ProUCL User Guide]

Chromium

Number of Valid Observations	48
Number of Distinct Observations	42
Minimum	8.96
Maximum	44.6
Mean	15.07
Median	14.1

SD	5.536
Variance	30.64
Coefficient of Variation	0.367
Skewness	3.399
Mean of log data	2.667
SD of log data	0.286

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	16.41
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	16.81
95% Modified-t UCL	16.48
Non-Parametric UCLs	
95% CLT UCL	16.39
95% Jackknife UCL	16.41
95% Standard Bootstrap UCL	16.38
95% Bootstrap-t UCL	17.12
95% Hall's Bootstrap UCL	22.5
95% Percentile Bootstrap UCL	16.55
95% BCA Bootstrap UCL	16.98
95% Chebyshev(Mean, Sd) UCL	18.56
97.5% Chebyshev(Mean, Sd) UCL	20.06
99% Chebyshev(Mean, Sd) UCL	23.02

Potential UCL to Use	
Use 95% Student's-t UCL	16.41
Or 95% Modified-t UCL	**16.48**

Chromium VI

Total Number of Data	25
Number of Non-Detect Data	19
Number of Detected Data	**6**
Minimum Detected	1.3
Maximum Detected	4.04
Percent Non-Detects	**76.00%**
Minimum Non-detect	0.361
Maximum Non-detect	2.98
Mean of Detected Data	2.667
Median of Detected Data	2.585
Variance of Detected Data	1.786
SD of Detected Data	1.337
CV of Detected Data	0.501
Skewness of Detected Data	0.0422
Mean of Detected log data	0.864

SD of Detected Log data	0.542

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	22
Number treated as Detected	3
Single DL Percent Detection	88.00%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	1.631
SD	0.835
Standard Error of Mean	0.183
95% KM (t) UCL	1.944
95% KM (z) UCL	1.932
95% KM (BCA) UCL	3.616
95% KM (Percentile Bootstrap) UCL	2.136
95% KM (Chebyshev) UCL	2.429
97.5% KM (Chebyshev) UCL	2.774
99% KM (Chebyshev) UCL	3.452

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median <0.56700**
[per recommendation in ProUCL User Guide]

Chrysene

Total Number of Data	48
Number of Non-Detect Data	29
Number of Detected Data	**19**
Minimum Detected	0.011
Maximum Detected	4.05
Percent Non-Detects	**60.42%**
Minimum Non-detect	0.00755
Maximum Non-detect	0.253

Mean of Detected Data	0.525

Median of Detected Data	0.0813
Variance of Detected Data	1.167
SD of Detected Data	1.08
CV of Detected Data	2.059
Skewness of Detected Data	2.633
Mean of Detected log data	-2.274
SD of Detected Log data	1.773

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	43
Number treated as Detected	5
Single DL Percent Detection	89.58%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.215
SD	0.708
Standard Error of Mean	0.105
95% KM (t) UCL	0.391
95% KM (z) UCL	0.388
95% KM (BCA) UCL	0.421
95% KM (Percentile Bootstrap) UCL	0.405
95% KM (Chebyshev) UCL	0.673
97.5% KM (Chebyshev) UCL	**0.871**
99% KM (Chebyshev) UCL	1.259

Potential UCL to Use ________

Cobalt

Number of Valid Observations	48
Number of Distinct Observations	46
Minimum	3
Maximum	9.89
Mean	6.977
Median	7.29
SD	1.408
Variance	1.983
Coefficient of Variation	0.202
Skewness	-0.339
Mean of log data	1.92
SD of log data	0.223

95% Useful UCLs

Student's-t UCL	**7.318**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	7.3
95% Modified-t UCL	7.316
Non-Parametric UCLs	
95% CLT UCL	7.311
95% Jackknife UCL	7.318
95% Standard Bootstrap UCL	7.311
95% Bootstrap-t UCL	7.306
95% Hall's Bootstrap UCL	7.325
95% Percentile Bootstrap UCL	7.313
95% BCA Bootstrap UCL	7.304
95% Chebyshev(Mean, Sd) UCL	7.863
97.5% Chebyshev(Mean, Sd) UCL	8.246
99% Chebyshev(Mean, Sd) UCL	8.999

Data appear Normal (0.05)
May want to try Normal UCLs

Copper

Number of Valid Observations	48
Number of Distinct Observations	44
Minimum	5.44
Maximum	49
Mean	14.49
Median	13.15
SD	8.49
Variance	72.09
Coefficient of Variation	0.586
Skewness	2.371
Mean of log data	2.553
SD of log data	0.471
95% Useful UCLs	
Student's-t UCL	16.55
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	16.96
95% Modified-t UCL	16.62
Non-Parametric UCLs	
95% CLT UCL	16.51
95% Jackknife UCL	16.55
95% Standard Bootstrap UCL	16.52
95% Bootstrap-t UCL	17.22
95% Hall's Bootstrap UCL	17.57
95% Percentile Bootstrap UCL	16.61

95% BCA Bootstrap UCL	17.21
95% Chebyshev(Mean, Sd) UCL	19.83
97.5% Chebyshev(Mean, Sd) UCL	**22.14**
99% Chebyshev(Mean, Sd) UCL	26.68

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Dibenz(a,h)anthracene

Total Number of Data	48
Number of Non-Detect Data	42
Number of Detected Data	**6**
Minimum Detected	0.129
Maximum Detected	2.91
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.00635
Maximum Non-detect	0.743

Mean of Detected Data	1.391
Median of Detected Data	1.084
Variance of Detected Data	1.688
SD of Detected Data	1.299
CV of Detected Data	0.934
Skewness of Detected Data	0.291
Mean of Detected log data	-0.265
SD of Detected Log data	1.334

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	45
Number treated as Detected	3
Single DL Percent Detection	93.75%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.287
SD	0.592
Standard Error of Mean	0.0936

95% KM (t) UCL	0.444
95% KM (z) UCL	0.441
95% KM (BCA) UCL	1.896
95% KM (Percentile Bootstrap) UCL	0.676
95% KM (Chebyshev) UCL	0.695
97.5% KM (Chebyshev) UCL	0.872
99% KM (Chebyshev) UCL	1.218

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median <0.03750**
[per recommendation in ProUCL User Guide]

Dibenzofuran

Total Number of Data	48
Number of Non-Detect Data	45
Number of Detected Data	**3**
Minimum Detected	0.01
Maximum Detected	0.08
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.00506
Maximum Non-detect	0.103

Mean of Detected Data	0.0525
Median of Detected Data	0.0674
Variance of Detected Data	0.00139
SD of Detected Data	0.0373
CV of Detected Data	0.711
Skewness of Detected Data	-1.513
Mean of Detected log data	-3.276
SD of Detected Log data	1.154

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	48
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0129
SD	0.0133
Standard Error of Mean	0.00243
95% KM (t) UCL	0.0169
95% KM (z) UCL	0.0169
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.08
95% KM (Chebyshev) UCL	0.0235
97.5% KM (Chebyshev) UCL	0.028
99% KM (Chebyshev) UCL	0.0371

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median** **<0.01555**
[per recommendation in ProUCL User Guide]

Endosulfan sulfate

Total Number of Data	48
Number of Non-Detect Data	45
Number of Detected Data	**3**
Minimum Detected	0.00731
Maximum Detected	0.06
Percent Non-Detects	**93.75%**
Minimum Non-detect	2.89E-04
Maximum Non-detect	0.00527
Mean of Detected Data	0.0257
Median of Detected Data	0.00989
Variance of Detected Data	8.82E-04
SD of Detected Data	0.0297
CV of Detected Data	1.154
Skewness of Detected Data	1.717
Mean of Detected log data	-4.116
SD of Detected Log data	1.138

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00846
SD	0.00753
Standard Error of Mean	0.00133
95% KM (t) UCL	0.0107
95% KM (z) UCL	0.0107
95% KM (BCA) UCL	0.06
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0143
97.5% KM (Chebyshev) UCL	0.0168
99% KM (Chebyshev) UCL	0.0217

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median <0.00044**
[per recommendation in ProUCL User Guide]

Endrin aldehyde

Total Number of Data	48
Number of Non-Detect Data	39
Number of Detected Data	**9**
Minimum Detected	5.66E-04
Maximum Detected	0.01
Percent Non-Detects	**81.25%**
Minimum Non-detect	3.94E-04
Maximum Non-detect	0.00579

Mean of Detected Data	0.00434
Median of Detected Data	0.00431
Variance of Detected Data	1.42E-05
SD of Detected Data	0.00377
CV of Detected Data	0.869
Skewness of Detected Data	0.564
Mean of Detected log data	-5.917
SD of Detected Log data	1.135

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	45
Number treated as Detected	3
Single DL Percent Detection	93.75%

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00128
SD	0.00213
Standard Error of Mean	3.27E-04
95% KM (t) UCL	0.00183
95% KM (z) UCL	0.00182
95% KM (BCA) UCL	0.00233
95% KM (Percentile Bootstrap) UCL	0.00214
95% KM (Chebyshev) UCL	0.0027
97.5% KM (Chebyshev) UCL	**0.00332**
99% KM (Chebyshev) UCL	0.00453

Data appear Normal (0.05)
May want to try Normal UCLs

Endrin ketone

Total Number of Data	48
Number of Non-Detect Data	45
Number of Detected Data	**3**
Minimum Detected	0.00329
Maximum Detected	0.013
Percent Non-Detects	**93.75%**
Minimum Non-detect	3.79E-04
Maximum Non-detect	0.00527
Mean of Detected Data	0.00749
Median of Detected Data	0.00619
Variance of Detected Data	2.48E-05
SD of Detected Data	0.00498
CV of Detected Data	0.665
Skewness of Detected Data	1.096
Mean of Detected log data	-5.048
SD of Detected Log data	0.688

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	46
Number treated as Detected	2
Single DL Percent Detection	95.83%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00355
SD	0.00144
Standard Error of Mean	2.54E-04
95% KM (t) UCL	0.00398
95% KM (z) UCL	0.00397
95% KM (BCA) UCL	0.013
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.00466
97.5% KM (Chebyshev) UCL	0.00514
99% KM (Chebyshev) UCL	0.00608

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median** **<0.00055**
[per recommendation in ProUCL User Guide]

Fluoranthene

Total Number of Data	48
Number of Non-Detect Data	35
Number of Detected Data	**13**
Minimum Detected	0.012
Maximum Detected	2.17
Percent Non-Detects	**72.92%**
Minimum Non-detect	0.00647
Maximum Non-detect	0.213
Mean of Detected Data	0.346

Median of Detected Data	0.0548
Variance of Detected Data	0.444
SD of Detected Data	0.667
CV of Detected Data	1.925
Skewness of Detected Data	2.359
Mean of Detected log data	-2.413
SD of Detected Log data	1.622

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	45
Number treated as Detected	3
Single DL Percent Detection	93.75%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.104
SD	0.365
Standard Error of Mean	0.0548
95% KM (t) UCL	0.196
95% KM (z) UCL	0.194
95% KM (BCA) UCL	0.213
95% KM (Percentile Bootstrap) UCL	0.206
95% KM (Chebyshev) UCL	0.343
97.5% KM (Chebyshev) UCL	**0.446**
99% KM (Chebyshev) UCL	0.649

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Fluorene

Total Number of Data	48
Number of Non-Detect Data	44
Number of Detected Data	**4**
Minimum Detected	0.015
Maximum Detected	0.139
Percent Non-Detects	**91.67%**
Minimum Non-detect	0.00659
Maximum Non-detect	0.135

Mean of Detected Data	0.0923
Median of Detected Data	0.108
Variance of Detected Data	0.00313
SD of Detected Data	0.0559

CV of Detected Data	0.606
Skewness of Detected Data	-1.209
Mean of Detected log data	-2.667
SD of Detected Log data	1.041

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	47
Number treated as Detected	1
Single DL Percent Detection	97.92%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0217
SD	0.0259
Standard Error of Mean	0.00439
95% KM (t) UCL	0.029
95% KM (z) UCL	0.0289
95% KM (BCA) UCL	0.139
95% KM (Percentile Bootstrap) UCL	0.128
95% KM (Chebyshev) UCL	0.0408
97.5% KM (Chebyshev) UCL	0.0491
99% KM (Chebyshev) UCL	0.0653

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median <0.01100**
[per recommendation in ProUCL User Guide]

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gamma-Chlordane

Total Number of Data	48
Number of Non-Detect Data	44
Number of Detected Data	**4**
Minimum Detected	7.69E-04
Maximum Detected	0.0036
Percent Non-Detects	**91.67%**
Minimum Non-detect	2.40E-04

Maximum Non-detect	0.00423
Mean of Detected Data	0.00203
Median of Detected Data	0.00188
Variance of Detected Data	1.91E-06
SD of Detected Data	0.00138
CV of Detected Data	0.68
Skewness of Detected Data	0.276
Mean of Detected log data	-6.403
SD of Detected Log data	0.761

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	48
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	8.77E-04
SD	4.96E-04
Standard Error of Mean	8.35E-05
95% KM (t) UCL	0.00102
95% KM (z) UCL	0.00101
95% KM (BCA) UCL	0.0036
95% KM (Percentile Bootstrap) UCL	0.00283
95% KM (Chebyshev) UCL	0.00124
97.5% KM (Chebyshev) UCL	0.0014
99% KM (Chebyshev) UCL	0.00171

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median <0.00044**
[per recommendation in ProUCL User Guide]

Indeno(1,2,3-cd)pyrene

Total Number of Data	48

Number of Non-Detect Data	25
Number of Detected Data	**23**
Minimum Detected	0.0628
Maximum Detected	1.94
Percent Non-Detects	**52.08%**
Minimum Non-detect	0.013
Maximum Non-detect	0.55
Mean of Detected Data	0.388
Median of Detected Data	0.118
Variance of Detected Data	0.279
SD of Detected Data	0.528
CV of Detected Data	1.361
Skewness of Detected Data	1.896
Mean of Detected log data	-1.668
SD of Detected Log data	1.156

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	42
Number treated as Detected	6
Single DL Percent Detection	87.50%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.22
SD	0.393
Standard Error of Mean	0.0579
95% KM (t) UCL	0.317
95% KM (z) UCL	0.315
95% KM (BCA) UCL	0.317
95% KM (Percentile Bootstrap) UCL	0.321
95% KM (Chebyshev) UCL	0.472
97.5% KM (Chebyshev) UCL	0.581
99% KM (Chebyshev) UCL	0.796

Potential UCL to Use

95% KM (BCA) UCL	**0.317**

Iron

Number of Valid Observations	48
Number of Distinct Observations	37
Minimum	11100
Maximum	60900

Mean	17152
Median	16650
SD	6903
Variance	47645953
Coefficient of Variation	0.402
Skewness	5.582
Mean of log data	9.71
SD of log data	0.25

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	18824
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	19649
95% Modified-t UCL	18958
Non-Parametric UCLs	
95% CLT UCL	18791
95% Jackknife UCL	18824
95% Standard Bootstrap UCL	18718
95% Bootstrap-t UCL	20832
95% Hall's Bootstrap UCL	25660
95% Percentile Bootstrap UCL	18863
95% BCA Bootstrap UCL	20117
95% Chebyshev(Mean, Sd) UCL	21495
97.5% Chebyshev(Mean, Sd) UCL	23374
99% Chebyshev(Mean, Sd) UCL	27065
Potential UCL to Use	
Use 95% Student's-t UCL	18824
Or 95% Modified-t UCL	**18958**

Lead

Number of Valid Observations	48
Number of Distinct Observations	45
Minimum	9.4
Maximum	237
Mean	25.36
Median	16.7
SD	34.13
Variance	1165
Coefficient of Variation	1.346
Skewness	5.449
Mean of log data	2.969
SD of log data	0.571

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	33.62
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	37.6
95% Modified-t UCL	34.27
Non-Parametric UCLs	
95% CLT UCL	33.46
95% Jackknife UCL	33.62
95% Standard Bootstrap UCL	33.12
95% Bootstrap-t UCL	48.81
95% Hall's Bootstrap UCL	62.56
95% Percentile Bootstrap UCL	34.42
95% BCA Bootstrap UCL	39.58
95% Chebyshev(Mean, Sd) UCL	46.83
97.5% Chebyshev(Mean, Sd) UCL	56.12
99% Chebyshev(Mean, Sd) UCL	74.38
Potential UCL to Use	
Use 95% Chebyshev (Mean, Sd) UCL	**46.83**

Lithium

Number of Valid Observations	48
Number of Distinct Observations	43
Minimum	5.43
Maximum	27.6
Mean	18.65
Median	18.75
SD	3.754
Variance	14.09
Coefficient of Variation	0.201
Skewness	-0.745
Mean of log data	2.9
SD of log data	0.25
95% Useful UCLs	
Student's-t UCL	**19.56**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	19.48
95% Modified-t UCL	19.55
Non-Parametric UCLs	
95% CLT UCL	19.55
95% Jackknife UCL	19.56
95% Standard Bootstrap UCL	19.57
95% Bootstrap-t UCL	19.51

95% Hall's Bootstrap UCL	19.54
95% Percentile Bootstrap UCL	19.56
95% BCA Bootstrap UCL	19.43
95% Chebyshev(Mean, Sd) UCL	21.02
97.5% Chebyshev(Mean, Sd) UCL	22.04
99% Chebyshev(Mean, Sd) UCL	24.05

Data appear Normal (0.05)
May want to try Normal UCLs

Manganese

Number of Valid Observations	48
Number of Distinct Observations	48
Minimum	87.6
Maximum	1010
Mean	331.8
Median	275
SD	205.9
Variance	42405
Coefficient of Variation	0.621
Skewness	1.558
Mean of log data	5.638
SD of log data	0.583
95% Useful UCLs	
Student's-t UCL	381.7
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	387.8
95% Modified-t UCL	382.8
Non-Parametric UCLs	
95% CLT UCL	380.7
95% Jackknife UCL	381.7
95% Standard Bootstrap UCL	380.9
95% Bootstrap-t UCL	388.6
95% Hall's Bootstrap UCL	389.8
95% Percentile Bootstrap UCL	381.8
95% BCA Bootstrap UCL	387.6
95% Chebyshev(Mean, Sd) UCL	461.3
97.5% Chebyshev(Mean, Sd) UCL	**517.4**
99% Chebyshev(Mean, Sd) UCL	627.5

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Mercury

Total Number of Data	48
Number of Non-Detect Data	21
Number of Detected Data	**27**
Minimum Detected	0.0061
Maximum Detected	0.081
Percent Non-Detects	**43.75%**
Minimum Non-detect	0.0025
Maximum Non-detect	0.038
Mean of Detected Data	0.0294
Median of Detected Data	0.024
Variance of Detected Data	4.64E-04
SD of Detected Data	0.0215
CV of Detected Data	0.733
Skewness of Detected Data	1.056
Mean of Detected log data	-3.791
SD of Detected Log data	0.758

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	40
Number treated as Detected	8
Single DL Percent Detection	83.33%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0204
SD	0.019
Standard Error of Mean	0.00282
95% KM (t) UCL	0.0251
95% KM (z) UCL	0.025
95% KM (BCA) UCL	0.0256
95% KM (Percentile Bootstrap) UCL	0.0251
95% KM (Chebyshev) UCL	0.0327
97.5% KM (Chebyshev) UCL	**0.038**
99% KM (Chebyshev) UCL	0.0485

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Molybdenum

Total Number of Data	48
Number of Non-Detect Data	10
Number of Detected Data	38

Minimum Detected	0.13
Maximum Detected	3.24
Percent Non-Detects	20.83%
Minimum Non-detect	0.074
Maximum Non-detect	0.084
Mean of Detected Data	0.723
Median of Detected Data	0.445
Variance of Detected Data	0.482
SD of Detected Data	0.694
CV of Detected Data	0.961
Skewness of Detected Data	2.229
Mean of Detected log data	-0.636
SD of Detected Log data	0.754

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	0.754
Mean	0.413
SD	0.229
95% Winsor (t) UCL	0.47

Kaplan Meier (KM) Method

Mean	0.599
SD	0.655
Standard Error of Mean	0.0959
95% KM (t) UCL	0.76
95% KM (z) UCL	0.757
95% KM (BCA) UCL	0.775
95% KM (Percentile Bootstrap) UCL	0.769
95% KM (Chebyshev) UCL	1.017
97.5% KM (Chebyshev) UCL	**1.198**
99% KM (Chebyshev) UCL	1.553

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Nickel

Number of Valid Observations	50
Number of Distinct Observations	43
Minimum	10.9
Maximum	27.7
Mean	17.29
Median	17.3

SD	3.391
Variance	11.5
Coefficient of Variation	0.196
Skewness	0.421
Mean of log data	2.831
SD of log data	0.197

95% Useful UCLs	
Student's-t UCL	**18.09**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	18.11
95% Modified-t UCL	18.09

Non-Parametric UCLs	
95% CLT UCL	18.07
95% Jackknife UCL	18.09
95% Standard Bootstrap UCL	18.08
95% Bootstrap-t UCL	18.1
95% Hall's Bootstrap UCL	18.14
95% Percentile Bootstrap UCL	18.04
95% BCA Bootstrap UCL	18.12
95% Chebyshev(Mean, Sd) UCL	19.38
97.5% Chebyshev(Mean, Sd) UCL	20.28
99% Chebyshev(Mean, Sd) UCL	22.06

Data appear Normal (0.05)
May want to try Normal UCLs

Phenanthrene

Total Number of Data	48
Number of Non-Detect Data	36
Number of Detected Data	**12**
Minimum Detected	0.023
Maximum Detected	1.3
Percent Non-Detects	**75.00%**
Minimum Non-detect	0.00616
Maximum Non-detect	0.125

Mean of Detected Data	0.268
Median of Detected Data	0.0938
Variance of Detected Data	0.209
SD of Detected Data	0.457
CV of Detected Data	1.707
Skewness of Detected Data	2.03
Mean of Detected log data	-2.324
SD of Detected Log data	1.352

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),	
Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	44
Number treated as Detected	4
Single DL Percent Detection	91.67%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0846
SD	0.243
Standard Error of Mean	0.0366
95% KM (t) UCL	0.146
95% KM (z) UCL	0.145
95% KM (BCA) UCL	0.156
95% KM (Percentile Bootstrap) UCL	0.149
95% KM (Chebyshev) UCL	0.244
97.5% KM (Chebyshev) UCL	0.313
99% KM (Chebyshev) UCL	0.449

Potential UCL to Use	
95% KM (BCA) UCL	**0.156**

Pyrene

Total Number of Data	48
Number of Non-Detect Data	29
Number of Detected Data	**19**
Minimum Detected	0.0159
Maximum Detected	1.64
Percent Non-Detects	**60.42%**
Minimum Non-detect	0.00816
Maximum Non-detect	0.371

Mean of Detected Data	0.355
Median of Detected Data	0.109
Variance of Detected Data	0.255
SD of Detected Data	0.505
CV of Detected Data	1.42
Skewness of Detected Data	1.636
Mean of Detected log data	-2.033
SD of Detected Log data	1.485

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),	
Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	43

Number treated as Detected	5
Single DL Percent Detection	89.58%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.152
SD	0.351
Standard Error of Mean	0.052
95% KM (t) UCL	0.239
95% KM (z) UCL	0.237
95% KM (BCA) UCL	0.254
95% KM (Percentile Bootstrap) UCL	0.245
95% KM (Chebyshev) UCL	0.379
97.5% KM (Chebyshev) UCL	**0.477**
99% KM (Chebyshev) UCL	0.669

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Strontium

Number of Valid Observations	48
Number of Distinct Observations	47
Minimum	18.8
Maximum	330
Mean	67
Median	54
SD	52.81
Variance	2789
Coefficient of Variation	0.788
Skewness	3.229
Mean of log data	4.025
SD of log data	0.557

95% Useful UCLs	
Student's-t UCL	79.79
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	83.33
95% Modified-t UCL	80.38
Non-Parametric UCLs	
95% CLT UCL	79.53
95% Jackknife UCL	79.79
95% Standard Bootstrap UCL	79.32
95% Bootstrap-t UCL	88.66

95% Hall's Bootstrap UCL	98.83
95% Percentile Bootstrap UCL	81.07
95% BCA Bootstrap UCL	85.31
95% Chebyshev(Mean, Sd) UCL	100.2
97.5% Chebyshev(Mean, Sd) UCL	**114.6**
99% Chebyshev(Mean, Sd) UCL	142.8

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Tin

Total Number of Data	48
Number of Non-Detect Data	44
Number of Detected Data	**4**
Minimum Detected	3.45
Maximum Detected	4.61
Percent Non-Detects	**91.67%**
Minimum Non-detect	0.4
Maximum Non-detect	1.29
Mean of Detected Data	3.845
Median of Detected Data	3.66
Variance of Detected Data	0.27
SD of Detected Data	0.52
CV of Detected Data	0.135
Skewness of Detected Data	1.771
Mean of Detected log data	1.34
SD of Detected Log data	0.128

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	3.483
SD	0.17
Standard Error of Mean	0.0283
95% KM (t) UCL	3.53

95% KM (z) UCL	3.529
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	3.738
95% KM (Chebyshev) UCL	3.606
97.5% KM (Chebyshev) UCL	3.66
99% KM (Chebyshev) UCL	3.764

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median <0.60000**
[per recommendation in ProUCL User Guide]

Titanium

Number of Valid Observations	48
Number of Distinct Observations	44
Minimum	8.15
Maximum	68.7
Mean	29.14
Median	28
SD	13.88
Variance	192.7
Coefficient of Variation	0.476
Skewness	1.065
Mean of log data	3.267
SD of log data	0.465

95% Useful UCLs	
Student's-t UCL	32.5
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	32.77
95% Modified-t UCL	32.55
Non-Parametric UCLs	
95% CLT UCL	32.44
95% Jackknife UCL	32.5
95% Standard Bootstrap UCL	32.44
95% Bootstrap-t UCL	32.97
95% Hall's Bootstrap UCL	32.68
95% Percentile Bootstrap UCL	32.57
95% BCA Bootstrap UCL	32.71
95% Chebyshev(Mean, Sd) UCL	37.87
97.5% Chebyshev(Mean, Sd) UCL	**41.65**
99% Chebyshev(Mean, Sd) UCL	49.08

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Toluene

Total Number of Data	48
Number of Non-Detect Data	45
Number of Detected Data	**3**
Minimum Detected	0.00157
Maximum Detected	0.00214
Percent Non-Detects	**93.75%**
Minimum Non-detect	5.94E-04
Maximum Non-detect	0.0128
Mean of Detected Data	0.00178
Median of Detected Data	0.00162
Variance of Detected Data	9.96E-08
SD of Detected Data	3.16E-04
CV of Detected Data	0.178
Skewness of Detected Data	1.683
Mean of Detected log data	-6.343
SD of Detected Log data	0.17

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	48
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00158
SD	8.33E-05
Standard Error of Mean	1.50E-05
95% KM (t) UCL	0.00161
95% KM (z) UCL	0.00161
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.00214
95% KM (Chebyshev) UCL	0.00165
97.5% KM (Chebyshev) UCL	0.00168

99% KM (Chebyshev) UCL	0.00173

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median <0.00073**
[per recommendation in ProUCL User Guide]

Vanadium

Number of Valid Observations	48
Number of Distinct Observations	39
Minimum	9.02
Maximum	32
Mean	21.65
Median	21.75
SD	4.554
Variance	20.74
Coefficient of Variation	0.21
Skewness	-0.279
Mean of log data	3.05
SD of log data	0.233

95% Useful UCLs
Student's-t UCL 22.75

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	22.7
95% Modified-t UCL	22.74
Non-Parametric UCLs	
95% CLT UCL	22.73
95% Jackknife UCL	22.75
95% Standard Bootstrap UCL	22.72
95% Bootstrap-t UCL	22.75
95% Hall's Bootstrap UCL	22.77
95% Percentile Bootstrap UCL	22.7
95% BCA Bootstrap UCL	22.67
95% Chebyshev(Mean, Sd) UCL	24.51
97.5% Chebyshev(Mean, Sd) UCL	25.75
99% Chebyshev(Mean, Sd) UCL	28.19

Data appear Normal (0.05)
May want to try Normal UCLs

Zinc

Number of Valid Observations	53
Number of Distinct Observations	53

Minimum	31.5
Maximum	903
Mean	139.1
Median	84.3
SD	160.9
Variance	25899
Coefficient of Variation	1.157
Skewness	2.989
Mean of log data	4.558
SD of log data	0.795

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	176.1
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	185.2
95% Modified-t UCL	177.6
Non-Parametric UCLs	
95% CLT UCL	175.5
95% Jackknife UCL	176.1
95% Standard Bootstrap UCL	176.1
95% Bootstrap-t UCL	198.2
95% Hall's Bootstrap UCL	196.5
95% Percentile Bootstrap UCL	179.1
95% BCA Bootstrap UCL	183.4
95% Chebyshev(Mean, Sd) UCL	235.5
97.5% Chebyshev(Mean, Sd) UCL	277.1
99% Chebyshev(Mean, Sd) UCL	359

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL **235.5**

APPENDIX A-9

POND SEDIMENT

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	C:\Users\Michael\ . . . \ProUCL data analysis\Pond Sediment\Pond sediment data_ProUCL input.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2,4,6-Trichlorophenol

Total Number of Data	8
Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.0429
Maximum Detected	0.0429
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.025
Maximum Non-detect	0.033

Data set has all detected values equal to = 0.0429, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0429

**** Instead of UCL, EPC is selected to be median = <0.0269**
[per recommendation in ProUCL User Guide]

4,4'-DDD

Total Number of Data	8
Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.00068
Maximum Detected	0.00068
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.00046
Maximum Non-detect	0.026

Data set has all detected values equal to = 6.7600E-4, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 6.7600E-4

**** Instead of UCL, EPC is selected to be median = <0.020**
[per recommendation in ProUCL User Guide]

4,4'-DDT

Total Number of Data	8
Number of Non-Detect Data	5
Number of Detected Data	**3**
Minimum Detected	0.00111
Maximum Detected	0.00157
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.011
Maximum Non-detect	0.014
Mean of Detected Data	0.00127
Median of Detected Data	0.00113
Variance of Detected Data	6.76E-08
SD of Detected Data	2.60E-04
CV of Detected Data	0.205
Skewness of Detected Data	1.721

Mean of Detected log data	-6.682
SD of Detected Log data	0.195

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	8
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00127
SD	2.12E-04
Standard Error of Mean	1.50E-04
95% KM (t) UCL	0.00155
95% KM (z) UCL	0.00152
95% KM (BCA) UCL	0.00148
95% KM (Percentile Bootstrap) UCL	0.00157
95% KM (Chebyshev) UCL	0.00192
97.5% KM (Chebyshev) UCL	0.00221
99% KM (Chebyshev) UCL	0.00276

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0110**
[per recommendation in ProUCL User Guide]

Acetone

Total Number of Data	8
Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.0798
Maximum Detected	0.0798
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.00066
Maximum Non-detect	0.073

Data set has all detected values equal to = 0.0798, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0798

**** Instead of UCL, EPC is selected to be median = <0.0425**
[per recommendation in ProUCL User Guide]

Aluminum

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	7990
Maximum	16300
Mean	11748
Median	11550
SD	3382
Variance	11436193
Coefficient of Variation	0.288
Skewness	0.211
Mean of log data	9.334
SD of log data	0.293

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**14013**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	13810
95% Modified-t UCL	14028
Non-Parametric UCLs	
95% CLT UCL	13714
95% Jackknife UCL	14013
95% Standard Bootstrap UCL	13591
95% Bootstrap-t UCL	14179
95% Hall's Bootstrap UCL	13371
95% Percentile Bootstrap UCL	13634
95% BCA Bootstrap UCL	13558
95% Chebyshev(Mean, Sd) UCL	16959
97.5% Chebyshev(Mean, Sd) UCL	19214
99% Chebyshev(Mean, Sd) UCL	23644

Data appear Normal (0.05)
May want to try Normal UCLs

Antimony

Total Number of Data	8
Number of Non-Detect Data	5
Number of Detected Data	**3**
Minimum Detected	1.34
Maximum Detected	1.85
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.33
Maximum Non-detect	0.44
Mean of Detected Data	1.517
Median of Detected Data	1.36
Variance of Detected Data	0.0834
SD of Detected Data	0.289
CV of Detected Data	0.19
Skewness of Detected Data	1.723
Mean of Detected log data	0.405
SD of Detected Log data	0.182

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	1.406
SD	0.168
Standard Error of Mean	0.0727
95% KM (t) UCL	1.544
95% KM (z) UCL	1.526
95% KM (BCA) UCL	1.85
95% KM (Percentile Bootstrap) UCL	1.85
95% KM (Chebyshev) UCL	1.723
97.5% KM (Chebyshev) UCL	1.86
99% KM (Chebyshev) UCL	2.129

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.440**
[per recommendation in ProUCL User Guide]

Arsenic

Total Number of Data	8
Number of Non-Detect Data	5
Number of Detected Data	**3**
Minimum Detected	3.39
Maximum Detected	5.01
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.28
Maximum Non-detect	0.37
Mean of Detected Data	4.373
Median of Detected Data	4.72
Variance of Detected Data	0.746
SD of Detected Data	0.864
CV of Detected Data	0.198
Skewness of Detected Data	-1.515
Mean of Detected log data	1.461
SD of Detected Log data	0.21

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	3.759
SD	0.643
Standard Error of Mean	0.278
95% KM (t) UCL	4.286
95% KM (z) UCL	4.217
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	5.01
95% KM (Chebyshev) UCL	4.972
97.5% KM (Chebyshev) UCL	5.497
99% KM (Chebyshev) UCL	6.528

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.335**
[per recommendation in ProUCL User Guide]

Barium

Number of Valid Observations	8
Number of Distinct Observations	7
Minimum	108
Maximum	417
Mean	198.6
Median	128.5
SD	119.4
Variance	14249
Coefficient of Variation	0.601
Skewness	1.058
Mean of log data	5.149
SD of log data	0.553

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	278.6
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	284.9
95% Modified-t UCL	281.2
Non-Parametric UCLs	
95% CLT UCL	268
95% Jackknife UCL	278.6
95% Standard Bootstrap UCL	262.3
95% Bootstrap-t UCL	330.7
95% Hall's Bootstrap UCL	259.7
95% Percentile Bootstrap UCL	265.3
95% BCA Bootstrap UCL	272.6
95% Chebyshev(Mean, Sd) UCL	382.6
97.5% Chebyshev(Mean, Sd) UCL	462.2

99% Chebyshev(Mean, Sd) UCL	618.5
Potential UCL to Use	
Use 95% Chebyshev (Mean, Sd) UCL	**382.6**

Benzo(b)fluoranthene

Total Number of Data	8
Number of Non-Detect Data	2
Number of Detected Data	**6**
Minimum Detected	0.0293
Maximum Detected	0.106
Percent Non-Detects	**25.00%**
Minimum Non-detect	0.01
Maximum Non-detect	0.011
Mean of Detected Data	0.0618
Median of Detected Data	0.0597
Variance of Detected Data	0.00112
SD of Detected Data	0.0334
CV of Detected Data	0.541
Skewness of Detected Data	0.232
Mean of Detected log data	-2.919
SD of Detected Log data	0.579

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	0.579
Mean	0.0506
SD	0.027
95% Winsor (t) UCL	0.073
Kaplan Meier (KM) Method	
Mean	0.0537
SD	0.0299
Standard Error of Mean	0.0116
95% KM (t) UCL	0.0756
95% KM (z) UCL	0.0727
95% KM (BCA) UCL	0.0746
95% KM (Percentile Bootstrap) UCL	0.0746
95% KM (Chebyshev) UCL	0.104
97.5% KM (Chebyshev) UCL	0.126
99% KM (Chebyshev) UCL	0.169

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0338**
[per recommendation in ProUCL User Guide]

Benzo(g,h,i)perylene

Total Number of Data	8

Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.135
Maximum Detected	0.135
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.015
Maximum Non-detect	0.02

Data set has all detected values equal to = 0.135, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.135

**** Instead of UCL, EPC is selected to be median = <0.0159**
[per recommendation in ProUCL User Guide]

Benzo(k)fluoranthene

Total Number of Data	8
Number of Non-Detect Data	5
Number of Detected Data	**3**
Minimum Detected	0.11
Maximum Detected	0.13
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.023
Maximum Non-detect	0.03
Mean of Detected Data	0.12
Median of Detected Data	0.119
Variance of Detected Data	1.00E-04
SD of Detected Data	0.01
CV of Detected Data	0.0837
Skewness of Detected Data	0.298
Mean of Detected log data	-2.125
SD of Detected Log data	0.0836

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.114
SD	0.00685
Standard Error of Mean	0.00297
95% KM (t) UCL	0.119
95% KM (z) UCL	0.119
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.13
95% KM (Chebyshev) UCL	0.127

97.5% KM (Chebyshev) UCL	0.132
99% KM (Chebyshev) UCL	0.143

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0275**
[per recommendation in ProUCL User Guide]

Beryllium

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	0.58
Maximum	1.13
Mean	0.834
Median	0.865
SD	0.206
Variance	0.0423
Coefficient of Variation	0.247
Skewness	0.0408
Mean of log data	-0.209
SD of log data	0.254

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs

Student's-t UCL	**0.972**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	0.954
95% Modified-t UCL	0.972
Non-Parametric UCLs	
95% CLT UCL	0.953
95% Jackknife UCL	0.972
95% Standard Bootstrap UCL	0.946
95% Bootstrap-t UCL	0.979
95% Hall's Bootstrap UCL	0.938
95% Percentile Bootstrap UCL	0.944
95% BCA Bootstrap UCL	0.946
95% Chebyshev(Mean, Sd) UCL	1.151
97.5% Chebyshev(Mean, Sd) UCL	1.288
99% Chebyshev(Mean, Sd) UCL	1.557

Data appear Normal (0.05)
May want to try Normal UCLs

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beta-BHC

Total Number of Data	8
Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.000699
Maximum Detected	0.000699
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.00049
Maximum Non-detect	0.03

Data set has all detected values equal to = 6.9900E-4, having '0' variation.

No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 6.9900E-4

**** Instead of UCL, EPC is selected to be median = <0.0230**
[per recommendation in ProUCL User Guide]

Boron

Total Number of Data	8
Number of Non-Detect Data	3
Number of Detected Data	**5**
Minimum Detected	11
Maximum Detected	28.4
Percent Non-Detects	**37.50%**
Minimum Non-detect	8.52
Maximum Non-detect	9.89
Mean of Detected Data	21.12
Median of Detected Data	25
Variance of Detected Data	65.87
SD of Detected Data	8.116
CV of Detected Data	0.384
Skewness of Detected Data	-0.574
Mean of Detected log data	2.98
SD of Detected Log data	0.438

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	17.33
SD	7.546
Standard Error of Mean	2.983
95% KM (t) UCL	22.98
95% KM (z) UCL	22.23
95% KM (BCA) UCL	26.33
95% KM (Percentile Bootstrap) UCL	26.28
95% KM (Chebyshev) UCL	30.33
97.5% KM (Chebyshev) UCL	35.95
99% KM (Chebyshev) UCL	47

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <12.4**
[per recommendation in ProUCL User Guide]

Bromomethane

Total Number of Data	8
Number of Non-Detect Data	6

Number of Detected Data	**2**
Minimum Detected	0.014
Maximum Detected	0.031
Percent Non-Detects	**75.00%**
Minimum Non-detect	0.00264
Maximum Non-detect	0.017
Mean of Detected Data	0.0225
Median of Detected Data	0.0225
Variance of Detected Data	1.45E-04
SD of Detected Data	0.012
CV of Detected Data	0.534
Skewness of Detected Data	N/A
Mean of Detected log data	-3.871
SD of Detected Log data	0.562

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	7
Number treated as Detected	1
Single DL Percent Detection	87.50%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0161
SD	0.00562
Standard Error of Mean	0.00281
95% KM (t) UCL	0.0215
95% KM (z) UCL	0.0207
95% KM (BCA) UCL	0.031
95% KM (Percentile Bootstrap) UCL	0.031
95% KM (Chebyshev) UCL	0.0284
97.5% KM (Chebyshev) UCL	0.0337
99% KM (Chebyshev) UCL	0.0441
Potential UCL to Use	
95% KM (t) UCL	0.0215
95% KM (% Bootstrap) UCL	0.031

**** Instead of UCL, EPC is selected to be median = <0.0135**
[per recommendation in ProUCL User Guide]

Cadmium

Total Number of Data 8

Number of Non-Detect Data	3
Number of Detected Data	**5**
Minimum Detected	0.19
Maximum Detected	0.27
Percent Non-Detects	**37.50%**
Minimum Non-detect	0.03
Maximum Non-detect	0.034
Mean of Detected Data	0.226
Median of Detected Data	0.23
Variance of Detected Data	0.00128
SD of Detected Data	0.0358
CV of Detected Data	0.158
Skewness of Detected Data	0.0524
Mean of Detected log data	-1.497
SD of Detected Log data	0.16

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.213
SD	0.0307
Standard Error of Mean	0.0121
95% KM (t) UCL	0.236
95% KM (z) UCL	0.232
95% KM (BCA) UCL	0.24
95% KM (Percentile Bootstrap) UCL	0.243
95% KM (Chebyshev) UCL	0.265
97.5% KM (Chebyshev) UCL	0.288
99% KM (Chebyshev) UCL	0.333

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.190**
[per recommendation in ProUCL User Guide]

Carbon disulfide

Total Number of Data	8
Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.00771
Maximum Detected	0.00771
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.00019
Maximum Non-detect	0.00205

Data set has all detected values equal to = 0.00771, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00771

**** Instead of UCL, EPC is selected to be median = <0.00096**
[per recommendation in ProUCL User Guide]

Chromium

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	8.29
Maximum	20.1
Mean	12.93
Median	11.55
SD	4.611
Variance	21.26
Coefficient of Variation	0.357
Skewness	0.57
Mean of log data	2.505
SD of log data	0.35

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**16.02**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	15.97
95% Modified-t UCL	16.08
Non-Parametric UCLs	
95% CLT UCL	15.61
95% Jackknife UCL	16.02
95% Standard Bootstrap UCL	15.51
95% Bootstrap-t UCL	16.56
95% Hall's Bootstrap UCL	15.49
95% Percentile Bootstrap UCL	15.56
95% BCA Bootstrap UCL	15.76
95% Chebyshev(Mean, Sd) UCL	20.04
97.5% Chebyshev(Mean, Sd) UCL	23.11
99% Chebyshev(Mean, Sd) UCL	29.15

Data appear Normal (0.05)
May want to try Normal UCLs

Chrysene

Total Number of Data	8
Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.0257
Maximum Detected	0.0257
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.013
Maximum Non-detect	0.017

Data set has all detected values equal to = 0.0257, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0257

**** Instead of UCL, EPC is selected to be median = <0.0140**

[per recommendation in ProUCL User Guide]

Cobalt

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	5.19
Maximum	8.99
Mean	6.939
Median	6.945
SD	1.378
Variance	1.898
Coefficient of Variation	0.199
Skewness	0.167
Mean of log data	1.92
SD of log data	0.2

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**7.862**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	7.771
95% Modified-t UCL	7.866
Non-Parametric UCLs	
95% CLT UCL	7.74
95% Jackknife UCL	7.862
95% Standard Bootstrap UCL	7.698
95% Bootstrap-t UCL	7.888
95% Hall's Bootstrap UCL	7.723
95% Percentile Bootstrap UCL	7.695
95% BCA Bootstrap UCL	7.695
95% Chebyshev(Mean, Sd) UCL	9.062
97.5% Chebyshev(Mean, Sd) UCL	9.981
99% Chebyshev(Mean, Sd) UCL	11.79

Data appear Normal (0.05)
May want to try Normal UCLs

Copper

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	8.33
Maximum	26.8
Mean	15.2
Median	12.55
SD	7.421
Variance	55.08
Coefficient of Variation	0.488
Skewness	0.836
Mean of log data	2.623
SD of log data	0.467

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**20.17**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	20.34
95% Modified-t UCL	20.3
Non-Parametric UCLs	
95% CLT UCL	19.51
95% Jackknife UCL	20.17
95% Standard Bootstrap UCL	19.15
95% Bootstrap-t UCL	23.41
95% Hall's Bootstrap UCL	21.13
95% Percentile Bootstrap UCL	19.25
95% BCA Bootstrap UCL	19.92
95% Chebyshev(Mean, Sd) UCL	26.64
97.5% Chebyshev(Mean, Sd) UCL	31.58
99% Chebyshev(Mean, Sd) UCL	41.31

Data appear Normal (0.05)
May want to try Normal UCLs

Iron

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	11300
Maximum	20100
Mean	15275
Median	15500
SD	3227
Variance	10416429
Coefficient of Variation	0.211
Skewness	0.139
Mean of log data	9.614
SD of log data	0.214

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**17437**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	17212
95% Modified-t UCL	17446
Non-Parametric UCLs	
95% CLT UCL	17152
95% Jackknife UCL	17437
95% Standard Bootstrap UCL	17037
95% Bootstrap-t UCL	17535
95% Hall's Bootstrap UCL	17130
95% Percentile Bootstrap UCL	17125
95% BCA Bootstrap UCL	17088
95% Chebyshev(Mean, Sd) UCL	20249
97.5% Chebyshev(Mean, Sd) UCL	22401
99% Chebyshev(Mean, Sd) UCL	26629

Data appear Normal (0.05)
May want to try Normal UCLs

Lead

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	10.6
Maximum	30.5
Mean	17.54
Median	15.5
SD	7.076
Variance	50.07
Coefficient of Variation	0.403
Skewness	0.923
Mean of log data	2.798
SD of log data	0.384

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**22.28**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	22.52
95% Modified-t UCL	22.41
Non-Parametric UCLs	
95% CLT UCL	21.65
95% Jackknife UCL	22.28
95% Standard Bootstrap UCL	21.32
95% Bootstrap-t UCL	23.59
95% Hall's Bootstrap UCL	23.41
95% Percentile Bootstrap UCL	21.54
95% BCA Bootstrap UCL	22.34
95% Chebyshev(Mean, Sd) UCL	28.44
97.5% Chebyshev(Mean, Sd) UCL	33.16
99% Chebyshev(Mean, Sd) UCL	42.43

Data appear Normal (0.05)
May want to try Normal UCLs

Lithium

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	13.5
Maximum	23.7
Mean	18.48
Median	18.85
SD	4.071
Variance	16.58
Coefficient of Variation	0.22
Skewness	0.00369
Mean of log data	2.895
SD of log data	0.225

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**21.2**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	20.84
95% Modified-t UCL	21.2

Non-Parametric UCLs	
95% CLT UCL	20.84
95% Jackknife UCL	21.2
95% Standard Bootstrap UCL	20.65
95% Bootstrap-t UCL	21.12
95% Hall's Bootstrap UCL	20.4
95% Percentile Bootstrap UCL	20.68
95% BCA Bootstrap UCL	20.68
95% Chebyshev(Mean, Sd) UCL	24.75
97.5% Chebyshev(Mean, Sd) UCL	27.46
99% Chebyshev(Mean, Sd) UCL	32.8

Data appear Normal (0.05)
May want to try Normal UCLs

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m,p-Cresol

Total Number of Data	8
Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.0375
Maximum Detected	0.0375
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.021
Maximum Non-detect	0.0253

Data set has all detected values equal to = 0.0375, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0375

**** Instead of UCL, EPC is selected to be median =**	**<0.0234**
[per recommendation in ProUCL User Guide]	

Manganese

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	352
Maximum	711
Mean	487.6
Median	453
SD	124.2
Variance	15417
Coefficient of Variation	0.255
Skewness	0.739
Mean of log data	6.162
SD of log data	0.247

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**570.8**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	572.1
95% Modified-t UCL	572.7
Non-Parametric UCLs	
95% CLT UCL	559.8
95% Jackknife UCL	570.8
95% Standard Bootstrap UCL	556.5
95% Bootstrap-t UCL	599
95% Hall's Bootstrap UCL	572.9
95% Percentile Bootstrap UCL	556
95% BCA Bootstrap UCL	563.6
95% Chebyshev(Mean, Sd) UCL	679
97.5% Chebyshev(Mean, Sd) UCL	761.8
99% Chebyshev(Mean, Sd) UCL	924.4

Data appear Normal (0.05)
May want to try Normal UCLs

Methyl iodide

Total Number of Data	8
Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.041
Maximum Detected	0.041
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.00159
Maximum Non-detect	0.017

Data set has all detected values equal to = 0.041, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.041

**** Instead of UCL, EPC is selected to be median = <0.00784**
[per recommendation in ProUCL User Guide]

Molybdenum

Total Number of Data	8
Number of Non-Detect Data	6
Number of Detected Data	**2**
Minimum Detected	0.21
Maximum Detected	0.6
Percent Non-Detects	**75.00%**
Minimum Non-detect	0.11
Maximum Non-detect	0.14
Mean of Detected Data	0.405
Median of Detected Data	0.405
Variance of Detected Data	0.0761
SD of Detected Data	0.276
CV of Detected Data	0.681
Skewness of Detected Data	N/A
Mean of Detected log data	-1.036
SD of Detected Log data	0.742

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.259
SD	0.129
Standard Error of Mean	0.0645
95% KM (t) UCL	0.381
95% KM (z) UCL	0.365
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.6
95% KM (Chebyshev) UCL	0.54
97.5% KM (Chebyshev) UCL	0.661
99% KM (Chebyshev) UCL	0.9
Potential UCL to Use	
95% KM (t) UCL	0.381
95% KM (% Bootstrap) UCL	0.6

**** Instead of UCL, EPC is selected to be median = <0.12**
[per recommendation in ProUCL User Guide]

Nickel

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	12.3
Maximum	20.6
Mean	16.33
Median	16.65
SD	3.09
Variance	9.551
Coefficient of Variation	0.189
Skewness	-0.0427
Mean of log data	2.777
SD of log data	0.193

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**18.4**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	18.1
95% Modified-t UCL	18.39

Non-Parametric UCLs	
95% CLT UCL	18.12
95% Jackknife UCL	18.4
95% Standard Bootstrap UCL	17.98
95% Bootstrap-t UCL	18.4
95% Hall's Bootstrap UCL	17.86
95% Percentile Bootstrap UCL	17.88
95% BCA Bootstrap UCL	17.96
95% Chebyshev(Mean, Sd) UCL	21.09
97.5% Chebyshev(Mean, Sd) UCL	23.15
99% Chebyshev(Mean, Sd) UCL	27.2

Data appear Normal (0.05)
May want to try Normal UCLs

Pyrene

Total Number of Data	8
Number of Non-Detect Data	5
Number of Detected Data	**3**
Minimum Detected	0.0201
Maximum Detected	0.0265
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.018
Maximum Non-detect	0.023
Mean of Detected Data	0.0232
Median of Detected Data	0.0231
Variance of Detected Data	1.03E-05
SD of Detected Data	0.0032
CV of Detected Data	0.138
Skewness of Detected Data	0.187
Mean of Detected log data	-3.769
SD of Detected Log data	0.138

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	6
Number treated as Detected	2
Single DL Percent Detection	75.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0213
SD	0.00221
Standard Error of Mean	9.55E-04
95% KM (t) UCL	0.0231
95% KM (z) UCL	0.0228
95% KM (BCA) UCL	0.0265

95% KM (Percentile Bootstrap) UCL	0.0265
95% KM (Chebyshev) UCL	0.0254
97.5% KM (Chebyshev) UCL	0.0272
99% KM (Chebyshev) UCL	0.0308

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0196**
[per recommendation in ProUCL User Guide]

Strontium

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	63.3
Maximum	181
Mean	103.6
Median	89.45
SD	41.82
Variance	1749
Coefficient of Variation	0.404
Skewness	1
Mean of log data	4.575
SD of log data	0.38

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs
Student's-t UCL 131.6

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	133.5
95% Modified-t UCL	132.5
Non-Parametric UCLs	
95% CLT UCL	127.9
95% Jackknife UCL	131.6
95% Standard Bootstrap UCL	126
95% Bootstrap-t UCL	151.9
95% Hall's Bootstrap UCL	138.6
95% Percentile Bootstrap UCL	127
95% BCA Bootstrap UCL	130.3
95% Chebyshev(Mean, Sd) UCL	168.1
97.5% Chebyshev(Mean, Sd) UCL	195.9
99% Chebyshev(Mean, Sd) UCL	250.7

Data appear Normal (0.05)
May want to try Normal UCLs

Titanium

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	19.1
Maximum	40.5
Mean	30
Median	32.65
SD	8.035
Variance	64.57

Coefficient of Variation	0.268
Skewness	-0.263
Mean of log data	3.367
SD of log data	0.286

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**35.38**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	34.39
95% Modified-t UCL	35.34
Non-Parametric UCLs	
95% CLT UCL	34.67
95% Jackknife UCL	35.38
95% Standard Bootstrap UCL	34.3
95% Bootstrap-t UCL	35.29
95% Hall's Bootstrap UCL	33.72
95% Percentile Bootstrap UCL	34.38
95% BCA Bootstrap UCL	34.13
95% Chebyshev(Mean, Sd) UCL	42.38
97.5% Chebyshev(Mean, Sd) UCL	47.74
99% Chebyshev(Mean, Sd) UCL	58.27

Data appear Normal (0.05)
May want to try Normal UCLs

Vanadium

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	16.8
Maximum	27.4
Mean	21.83
Median	21.8
SD	4.107
Variance	16.87
Coefficient of Variation	0.188
Skewness	0.0796
Mean of log data	3.067
SD of log data	0.19

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**24.58**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	24.26
95% Modified-t UCL	24.58
Non-Parametric UCLs	
95% CLT UCL	24.21
95% Jackknife UCL	24.58
95% Standard Bootstrap UCL	24.04
95% Bootstrap-t UCL	24.41

95% Hall's Bootstrap UCL	23.81
95% Percentile Bootstrap UCL	24.04
95% BCA Bootstrap UCL	24.15
95% Chebyshev(Mean, Sd) UCL	28.15
97.5% Chebyshev(Mean, Sd) UCL	30.89
99% Chebyshev(Mean, Sd) UCL	36.27

Data appear Normal (0.05)
May want to try Normal UCLs

Zinc

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	38.2
Maximum	999
Mean	332.3
Median	55.65
SD	407.7
Variance	166239
Coefficient of Variation	1.227
Skewness	0.879
Mean of log data	4.894
SD of log data	1.489

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	605.4
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	617.3
95% Modified-t UCL	612.9
Non-Parametric UCLs	
95% CLT UCL	569.4
95% Jackknife UCL	605.4
95% Standard Bootstrap UCL	557.3
95% Bootstrap-t UCL	767.6
95% Hall's Bootstrap UCL	474.7
95% Percentile Bootstrap UCL	549.9
95% BCA Bootstrap UCL	591.4
95% Chebyshev(Mean, Sd) UCL	**960.7**
97.5% Chebyshev(Mean, Sd) UCL	1233
99% Chebyshev(Mean, Sd) UCL	1767
Potential UCL to Use	
99% Chebyshev(Mean, Sd) UCL	1767

Recommended UCL exceeds the maximum observation

APPENDIX B

BACKGROUND COMPARISONS

APPENDIX B-1
BACKGROUND COMPARISONS
SOUTH OF MARLIN SURFACE SOIL

ANTIMONY - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Antimony	1.118	1.228	83	0.953	0.878	10

Calculated Difference =	0.165	
Standard Error of the Difference =	0.407177285	
Degree of Freedom =	91	
t =	0.405228892	
p =	0.3445	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	background mean is not statistically less than site mean

ARSENIC - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Arsenic	3.735	4.012	83	3.438	1.792	10

Calculated Difference =	0.297	
Standard Error of the Difference =	1.126036589	
Degree of Freedom =	91	
t =	0.263756971	
p =	0.3963	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

BARIUM - SOUTH OF MARLIN SURFACE SOIL

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Barium	345.2	349	83	333.1	288.1	10

Calculated Difference =	12.1	
Standard Error of the Difference =	124.3580544	
Degree of Freedom =	91	
t =	0.097299689	
p =	0.4614	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

CADMIUM - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Cadmium	0.464	1.141	83	0.0311	0.0398	10

Calculated Difference =	0.4329	
Standard Error of the Difference =	0.277019204	
Degree of Freedom =	91	
t =	1.562707545	
p =	0.0608	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

CHROMIUM - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Chromium	16.08	15.7	83	15.2	3.02	10

Calculated Difference =	0.88	
Standard Error of the Difference =	3.925742193	
Degree of Freedom =	91	
t =	0.224161434	
p =	0.4116	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

COPPER - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Copper	27.98	35.35	83	12.12	3.955	10

Calculated Difference =	15.86	
Standard Error of the Difference =	8.664375822	
Degree of Freedom =	91	
t =	1.830483849	
p =	0.0353	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically greater than background mean

LEAD - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lead	69.61	112.8	83	13.43	1.547	10

Calculated Difference =	56.18	
Standard Error of the Difference =	27.36239203	
Degree of Freedom =	91	
t =	2.053183068	
p =	0.0215	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically greater than background mean

LITHIUM - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lithium	7.856	5.715	83	21.14	5.166	10

Calculated Difference =	13.284	
Standard Error of the Difference =	2.142429492	
Degree of Freedom =	91	
t =	6.200437423	
p =	0.00	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically less than background mean

MANGANESE - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Manganese	257.4	129.3	83	377.4	93.75	10

Calculated Difference =	120	
Standard Error of the Difference =	43.15491673	
Degree of Freedom =	91	
t =	2.780679679	
p =	0.0033	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically less than background mean

MERCURY - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Mercury	0.0227	0.0752	83	0.0213	0.00479	10

Calculated Difference =	0.0014	
Standard Error of the Difference =	0.01830147	
Degree of Freedom =	91	
t =	0.076496585	
p =	0.4698	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

MOLYBDENUM - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Molybdenum	1.306	1.588	83	0.522	0.0739	10

Calculated Difference =	0.784	
Standard Error of the Difference =	0.385854899	
Degree of Freedom =	91	
t =	2.031851873	
p =	0.0225	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically greater than background mean

ZINC - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Zinc	601.2	672.8	83	247	364.6	10

Calculated Difference = 354.2
Standard Error of the Difference = 199.8008143
Degree of Freedom = 91
t = 1.772765547
p = 0.0399 calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different = Yes site surface soil mean is statistically greater than background mean

APPENDIX B-2

BACKGROUND COMPARISONS

SOUTH OF MARLIN SOIL

ANTIMONY - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Antimony	1.023	1.14	166	0.953	0.878	10

Calculated Difference =	0.07	
Standard Error of the Difference =	0.39183601	
Degree of Freedom =	174	
t =	0.178646164	
p =	0.4292	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	background mean is not statistically less than site mean

ARSENIC - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Arsenic	3.331	3.269	166	3.438	1.792	10

Calculated Difference =	0.107	
Standard Error of the Difference =	0.97454393	
Degree of Freedom =	174	
t =	0.109794948	
p =	0.4563	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

BARIUM - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Barium	237.4	274.8	166	333.1	288.1	10

Calculated Difference =	95.7	
Standard Error of the Difference =	112.8814519	
Degree of Freedom =	174	
t =	0.847792072	
p =	0.1989	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

CADMIUM - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Cadmium	0.335	0.859	166	0.0311	0.0398	10

Calculated Difference =	0.3039	
Standard Error of the Difference =	0.208717917	
Degree of Freedom =	174	
t =	1.456032165	
p =	0.0736	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

CHROMIUM - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Chromium	13.53	12.49	166	15.2	3.02	10

Calculated Difference =	1.67	
Standard Error of the Difference =	3.176242508	
Degree of Freedom =	174	
t =	0.525778493	
p =	0.2998	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

COPPER - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Copper	24.26	46.76	166	12.12	3.955	10

Calculated Difference =	12.14	
Standard Error of the Difference =	11.40971991	
Degree of Freedom =	174	
t =	1.064005085	
p =	0.1444	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

LEAD - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lead	53.52	104.2	166	13.43	1.547	10

Calculated Difference =	40.09	
Standard Error of the Difference =	25.27694655	
Degree of Freedom =	174	
t =	1.586030177	
p =	0.0573	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically greater than background mean

LITHIUM - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lithium	10.03	6.299	166	21.14	5.166	10

Calculated Difference =	11.11	
Standard Error of the Difference =	2.236676187	
Degree of Freedom =	174	
t =	4.967191972	
p =	0.00	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically less than background mean

MANGANESE - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Manganese	261.2	127.4	166	377.4	93.75	10

Calculated Difference =	116.2	
Standard Error of the Difference =	42.82121949	
Degree of Freedom =	174	
t =	2.713607912	
p =	0.0037	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically less than background mean

MERCURY - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Mercury	0.0262	0.0941	166	0.0213	0.00479	10

Calculated Difference =	0.0049	
Standard Error of the Difference =	0.022872813	
Degree of Freedom =	174	
t =	0.214228129	
p =	0.4153	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

MOLYBDENUM - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Molybdenum	0.89	1.488	166	0.522	0.0739	10

Calculated Difference =	0.368	
Standard Error of the Difference =	0.361648843	
Degree of Freedom =	174	
t =	1.017561668	
p =	0.1550	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

ZINC - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Zinc	433.8	786.8	166	247	364.6	10

Calculated Difference =	186.8	
Standard Error of the Difference =	222.9535182	
Degree of Freedom =	174	
t =	0.8378428	
p =	0.2016	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

APPENDIX B-3
BACKGROUND COMPARISONS
NORTH OF MARLIN SURFACE SOIL

ANTIMONY - NORTH OF MARLIN SURFACE SOIL

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Antimony	1.744	2.146	18	0.953	0.878	10

Calculated Difference =	0.791	
Standard Error of the Difference =	0.589906214	
Degree of Freedom =	26	
t =	1.340891114	
p =	0.0958	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

ARSENIC - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Arsenic	2.522	1.164	18	3.438	1.792	10

Calculated Difference =	0.916	
Standard Error of the Difference =	0.633108336	
Degree of Freedom =	26	
t =	1.446829789	
p =	0.0799	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

BARIUM - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Barium	145.2	115.8	18	333.1	288.1	10

Calculated Difference =	187.9	
Standard Error of the Difference =	95.33605484	
Degree of Freedom =	26	
t =	1.970922756	
p =	0.0297	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically less than background mean

CADMIUM - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Cadmium	0.207	0.252	18	0.0311	0.0398	10

Calculated Difference =	0.1759	
Standard Error of the Difference =	0.06240139	
Degree of Freedom =	26	
t =	2.818847487	
p =	0.0045	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically greater than background mean

CHROMIUM - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Chromium	20.26	27.58	18	15.2	3.02	10

Calculated Difference = 5.06
Standard Error of the Difference = 6.7569619
Degree of Freedom = 26
t = 0.748857264
p = 0.2303 calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different = No site soil mean is not statistically greater than background mean

COPPER - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Copper	24.13	44.66	18	12.12	3.955	10

Calculated Difference =	12.01	
Standard Error of the Difference =	10.90360718	
Degree of Freedom =	26	
t =	1.101470348	
p =	0.1405	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

LEAD - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lead	57.7	111.1	18	13.43	1.547	10

Calculated Difference =	44.27	
Standard Error of the Difference =	26.95014837	
Degree of Freedom =	26	
t =	1.64266257	
p =	0.0562	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically greater than background mean

LITHIUM - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lithium	16.57	5.136	18	21.14	5.166	10

Calculated Difference =	4.57	
Standard Error of the Difference =	2.054368963	
Degree of Freedom =	26	
t =	2.224527377	
p =	0.0175	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically less than background mean

MANGANESE - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Manganese	369.5	247.7	18	377.4	93.75	10

Calculated Difference =	7.9	
Standard Error of the Difference =	66.99284257	
Degree of Freedom =	26	
t =	0.117923045	
p =	0.4535	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically less than background mean

MERCURY - NORTH OF MARLIN SURFACE SOIL

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Mercury	0.0126	0.0163	18	0.0213	0.00479	10

Calculated Difference =	0.0087	
Standard Error of the Difference =	0.004233584	
Degree of Freedom =	26	
t =	2.054996426	
p =	0.0250	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

MOLYBDENUM - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Molybdenum	0.949	2.5	18	0.522	0.0739	10

Calculated Difference =	0.427	
Standard Error of the Difference =	0.606789238	
Degree of Freedom =	26	
t =	0.703703977	
p =	0.2439	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

ZINC - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Zinc	418.4	1308	18	247	364.6	10

Calculated Difference =	171.4	
Standard Error of the Difference =	337.5387012	
Degree of Freedom =	26	
t =	0.507793623	
p =	0.3080	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

APPENDIX B-4
BACKGROUND COMPARISONS
NORTH OF MARLIN SOIL

ANTIMONY - NORTH OF MARLIN SOIL

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Antimony	1.416	1.779	36	0.953	0.878	10

Calculated Difference =	0.463	
Standard Error of the Difference =	0.513084318	
Degree of Freedom =	44	
t =	0.902385794	
p =	0.1859	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

ARSENIC - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Arsenic	2.573	1.369	36	3.438	1.792	10

Calculated Difference =	0.865	
Standard Error of the Difference =	0.656788524	
Degree of Freedom =	44	
t =	1.317014486	
p =	0.0973	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

CADMIUM - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Cadmium	0.193	0.239	36	0.0311	0.0398	10

Calculated Difference =	0.1619	
Standard Error of the Difference =	0.059316632	
Degree of Freedom =	44	
t =	2.729419974	
p =	0.0045	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically greater than background mean

BARIUM - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Barium	142.1	95.9	36	333.1	288.1	10

Calculated Difference =	191	
Standard Error of the Difference =	94.02738869	
Degree of Freedom =	44	
t =	2.031323029	
p =	0.0242	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically less than background mean

CHROMIUM - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Chromium	17.17	19.6	36	15.2	3.02	10

Calculated Difference =	1.97	
Standard Error of the Difference =	4.848678898	
Degree of Freedom =	44	
t =	0.406296239	
p =	0.3432	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

COPPER - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Copper	18.7	31.9	36	12.12	3.955	10

Calculated Difference =	6.58	
Standard Error of the Difference =	7.837321881	
Degree of Freedom =	44	
t =	0.83957251	
p =	0.2028	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

LEAD - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lead	37.8	80.99	36	13.43	1.547	10

Calculated Difference =	24.37	
Standard Error of the Difference =	19.6490511	
Degree of Freedom =	44	
t =	1.240263455	
p =	0.1108	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically greater than background mean

LITHIUM - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lithium	18.84	5.952	36	21.14	5.166	10

Calculated Difference =	2.3	
Standard Error of the Difference =	2.180058677	
Degree of Freedom =	44	
t =	1.055017475	
p =	0.1486	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

MANGANESE - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Manganese	347	204.1	36	377.4	93.75	10

Calculated Difference =	30.4	
Standard Error of the Difference =	57.70014591	
Degree of Freedom =	44	
t =	0.526861753	
p =	0.3005	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically less than background mean

MOLYBDENUM - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Molybdenum	0.586	1.788	36	0.522	0.0739	10

Calculated Difference =	0.064	
Standard Error of the Difference =	0.434282915	
Degree of Freedom =	44	
t =	0.147369371	
p =	0.4417	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

MERCURY - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Mercury	0.0094	0.0124	36	0.0213	0.00479	10

Calculated Difference =	0.0119	
Standard Error of the Difference =	0.00336736	
Degree of Freedom =	44	
t =	3.533925295	
p =	0.0005	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

ZINC - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Zinc	242.5	929.4	36	247	364.6	10

Calculated Difference =	4.5	
Standard Error of the Difference =	253.1879948	
Degree of Freedom =	44	
t =	0.017773355	
p =	0.4929	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

APPENDIX B-5

BACKGROUND COMPARISONS

INTRACOASTAL WATERWAY SEDIMENT

4,4'-DDT - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
4,4'-DDT	0.00041103	0.0007962	17	0.0001555	0.00015569	9

Calculated Difference =	0.00025553	
Standard Error of the Difference =	0.000199284	
Degree of Freedom =	24	
t =	1.28223903	
p =	0.106	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

ALUMINUM - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Aluminum	6854	2346	16	12213	6892	9

Calculated Difference =	5359	
Standard Error of the Difference =	2252.49071	
Degree of Freedom =	23	
t =	2.379144107	
p =	0.013	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

ARSENIC - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Arsenic	4.026	1.4	16	5.813	3.107	9

Calculated Difference =	1.787	
Standard Error of the Difference =	1.039537887	
Degree of Freedom =	23	
t =	1.719033066	
p =	0.0495	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

BARIUM - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Barium	215.3	59.65	16	209.7	47.73	9

Calculated Difference =	5.6	
Standard Error of the Difference =	20.90733397	
Degree of Freedom =	23	
t =	0.267848594	
p =	0.3956	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

ANTIMONY - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Antimony	2.245	1.751	16	4.023	2.215	9

Calculated Difference =	1.778	
Standard Error of the Difference =	0.819130942	
Degree of Freedom =	23	
t =	2.170593136	
p =	0.0203	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

BENZO(B)FLUORANTHENE - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Benzo(b)fluoranthene	0.1	0.157	16	0.0087	0.0106	9

Calculated Difference =	0.0913	
Standard Error of the Difference =	0.038225347	
Degree of Freedom =	23	
t =	2.388467508	
p =	0.5	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

BERYLLIUM - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Beryllium	0.463	0.149	16	0.766	0.403	9

Calculated Difference =	0.303	
Standard Error of the Difference =	0.13246449	
Degree of Freedom =	23	
t =	2.287405473	
p =	0.0159	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

BORON - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Boron	12.04	9.92	16	27.64	12.82	9

Calculated Difference =	15.6	
Standard Error of the Difference =	4.714218044	
Degree of Freedom =	23	
t =	3.30913841	
p =	0.0015	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

COBALT - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Cobalt	4.385	1.131	16	6.698	3.165	9

Calculated Difference =	2.313	
Standard Error of the Difference =	1.037770333	
Degree of Freedom =	23	
t =	2.228816845	
p =	0.0179	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

COPPER - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Copper	7.112	2.997	16	8.138	5.165	9

Calculated Difference =	1.026	
Standard Error of the Difference =	1.787757246	
Degree of Freedom =	23	
t =	0.573903421	
p =	0.2858	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

IRON - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Iron	13352	5546	16	16496	8097	9

Calculated Difference =	3144	
Standard Error of the Difference =	2892.307356	
Degree of Freedom =	23	
t =	1.087021403	
p =	0.1441	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

LEAD - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lead	11.56	7.161	16	9.587	3.602	9

Calculated Difference =	1.973	
Standard Error of the Difference =	2.076994545	
Degree of Freedom =	23	
t =	0.949930275	
p =	0.1760	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

LITHIUM - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lithium	10.53	3.559	16	21.4	14.41	9

Calculated Difference =	10.87	
Standard Error of the Difference =	4.637876359	
Degree of Freedom =	23	
t =	2.343745102	
p =	0.0141	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

MANGANESE - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Manganese	283.3	87.59	16	330.7	88.99	9

Calculated Difference =	47.4	
Standard Error of the Difference =	35.25927685	
Degree of Freedom =	23	
t =	1.34432706	
p =	0.0960	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

MERCURY - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Mercury	0.0201	0.0073	16	0.0176	0.0132	9

Calculated Difference =	0.0025	
Standard Error of the Difference =	0.004534171	
Degree of Freedom =	23	
t =	0.551368717	
p =	0.5000	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

MOLYBDENUM - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Molybdenum	0.667	1.358	16	0.241	0.0675	9

Calculated Difference =	0.426	
Standard Error of the Difference =	0.330054329	
Degree of Freedom =	23	
t =	1.290696598	
p =	0.1048	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

NICKEL - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Nickel	9.589	2.741	16	14.91	8.111	9

Calculated Difference =	5.321	
Standard Error of the Difference =	2.649675082	
Degree of Freedom =	23	
t =	2.008170751	
p =	0.5000	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

STRONTIUM - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Strontium	44.86	14.43	16	59.17	22.06	9

Calculated Difference =	14.31	
Standard Error of the Difference =	7.804670623	
Degree of Freedom =	23	
t =	1.833517478	
p =	0.0398	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

TITANIUM - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Titanium	25.58	5.051	16	31.79	10.49	9

Calculated Difference =	6.21	
Standard Error of the Difference =	3.536205768	
Degree of Freedom =	23	
t =	1.756119527	
p =	0.0462	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

VANADIUM - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Vanadium	13.86	3.523	16	20.21	9.135	9

Calculated Difference =	6.35	
Standard Error of the Difference =	3.012459534	
Degree of Freedom =	23	
t =	2.107912133	
p =	0.0231	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

ZINC - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Zinc	45.36	19.88	16	36.04	13.68	9

Calculated Difference =	9.32	
Standard Error of the Difference =	6.477819531	
Degree of Freedom =	23	
t =	1.438755735	
p =	0.0818	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

APPENDIX B-6

BACKGROUND COMPARISONS

WETLAND SEDIMENT

ANTIMONY - WETLAND SEDIMENT

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Antimony	1.154	0.724	47	0.953	0.878	10

Calculated Difference =	0.201	
Standard Error of the Difference =	0.32851527	
Degree of Freedom =	55	
t =	0.611843706	
p =	0.2716	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

ARSENIC - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Arsenic	2.534	2.465	48	3.438	1.792	10

Calculated Difference =	0.904	
Standard Error of the Difference =	0.823742314	
Degree of Freedom =	56	
t =	1.097430573	
p =	0.1387	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

BARIUM - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Barium	151.7	136.5	48	333.1	288.1	10

Calculated Difference =	181.4	
Standard Error of the Difference =	96.93387285	
Degree of Freedom =	56	
t =	1.871378855	
p =	0.0333	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically less than background mean

CADMIUM - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Cadmium	0.103	0.146	48	0.0311	0.0398	10

Calculated Difference =	0.0719	
Standard Error of the Difference =	0.037580399	
Degree of Freedom =	56	
t =	1.913231441	
p =	0.0304	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically greater than background mean

CHROMIUM - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Chromium	15.07	5.536	48	15.2	3.02	10

Calculated Difference =	0.13	
Standard Error of the Difference =	1.647671726	
Degree of Freedom =	56	
t =	0.078899211	
p =	0.4687	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

COPPER - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Copper	14.49	8.49	48	12.12	3.955	10

Calculated Difference =	2.37	
Standard Error of the Difference =	2.409192475	
Degree of Freedom =	56	
t =	0.983732111	
p =	0.1647	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

LEAD - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lead	25.36	34.13	48	13.43	1.547	10

Calculated Difference =	11.93	
Standard Error of the Difference =	8.292183972	
Degree of Freedom =	56	
t =	1.438704211	
p =	0.0779	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically greater than background mean

LITHIUM - WETLAND SEDIMENT

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lithium	18.65	3.754	48	21.14	5.166	10

Calculated Difference =	2.49	
Standard Error of the Difference =	1.870221145	
Degree of Freedom =	56	
t =	1.331393353	
p =	0.0943	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

MANGANESE - WETLAND SEDIMENT

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Manganese	331.8	205.9	48	377.4	93.75	10

Calculated Difference =	45.6	
Standard Error of the Difference =	58.07511173	
Degree of Freedom =	56	
t =	0.785190052	
p =	0.2178	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically less than background mean

MERCURY - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Mercury	0.0199	0.0194	48	0.0213	0.00479	10

Calculated Difference =	0.0014	
Standard Error of the Difference =	0.004942998	
Degree of Freedom =	56	
t =	0.283228898	
p =	0.3890	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically less than background mean

MOLYBDENUM - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Molybdenum	0.581	0.677	48	0.522	0.0739	10

Calculated Difference =	0.059	
Standard Error of the Difference =	0.16585129	
Degree of Freedom =	56	
t =	0.355740374	
p =	0.3617	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

ZINC - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Zinc	139.1	160.9	53	247	364.6	10

Calculated Difference =	107.9	
Standard Error of the Difference =	121.7217613	
Degree of Freedom =	61	
t =	0.886447902	
p =	0.1896	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

APPENDIX B-7

BACKGROUND COMPARISONS

POND SEDIMENT

ANTIMONY - POND SEDIMENT

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Antimony	0.795	0.618	8	0.953	0.878	10

Calculated Difference =	0.158	
Standard Error of the Difference =	0.31552261	
Degree of Freedom =	16	
t =	0.500756506	
p =	0.3116	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

ARSENIC - POND SEDIMENT

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Arsenic	1.735	2.233	8	3.438	1.792	10

Calculated Difference =	1.703	
Standard Error of the Difference =	0.783860649	
Degree of Freedom =	16	
t =	2.172580039	
p =	0.0226	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

BARIUM - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Barium	198.6	119.4	8	333.1	288.1	10

Calculated Difference =	134.5	
Standard Error of the Difference =	95.59691633	
Degree of Freedom =	16	
t =	1.406949148	
p =	0.0893	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically less than background mean

CADMIUM - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Cadmium	0.147	0.112	8	0.0311	0.0398	10

Calculated Difference =	0.1159	
Standard Error of the Difference =	0.029938042	
Degree of Freedom =	16	
t =	3.871328672	
p =	0.0007	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically greater than background mean

CHROMIUM - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Chromium	12.93	4.611	8	15.2	3.02	10

Calculated Difference = 2.27

Standard Error of the Difference = 1.470614137

Degree of Freedom = 16

t = 1.543572812

p = 0.0711 calculated at www.stat.tamu.edu/~west/applets/tdemo.html

Data sets significantly different = No site soil mean is not statistically less than background mean

COPPER - POND SEDIMENT

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Copper	15.2	7.421	8	12.12	3.955	10

Calculated Difference =	3.08	
Standard Error of the Difference =	2.191731568	
Degree of Freedom =	16	
t =	1.40528158	
p =	0.0896	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

LEAD - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lead	17.54	7.076	8	13.43	1.547	10

Calculated Difference =	4.11	
Standard Error of the Difference =	1.784545276	
Degree of Freedom =	16	
t =	2.303107719	
p =	0.0175	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically greater than background mean

LITHIUM - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lithium	18.48	4.071	8	21.14	5.166	10

Calculated Difference =	2.66	
Standard Error of the Difference =	1.908832199	
Degree of Freedom =	16	
t =	1.393522176	
p =	0.0912	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

MANGANESE - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Manganese	487.6	124.2	8	377.4	93.75	10

Calculated Difference =	110.2	
Standard Error of the Difference =	42.26460503	
Degree of Freedom =	16	
t =	2.607382701	
p =	0.0095	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically greater than background mean

MOLYBDENUM - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Molybdenum	0.146	0.191	8	0.522	0.0739	10

Calculated Difference =	0.376	
Standard Error of the Difference =	0.051885086	
Degree of Freedom =	16	
t =	7.24678375	
p =	0.0000	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

ZINC - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Zinc	332.3	407.7	8	247	364.6	10

Calculated Difference =	85.3	
Standard Error of the Difference =	151.8911495	
Degree of Freedom =	16	
t =	0.561586375	
p =	0.2910	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

APPENDIX C

INTAKE CALCULATIONS

APPENDIX C-1

INTAKE CALCULATIONS

SOUTH OF MARLIN SOIL

TABLE C-1
EXPOSURE POINT CONCENTATION (mg/kg) FOR COPCs
SOIL SOUTH OF MARLIN AVE.

Parameter	Average		95% UCL	Statistic Used
4,4-DDD	7.76E-03		5.08E-02	97.5% KM (Chebyshev)
Aluminum	6.45E+03		8.20E+03	97.5% Chebyshev
Aroclor-1254	2.16E-01		7.73E-01	97.5% KM (Chebyshev)
Benzo(a)anthracene	2.69E-01		6.43E-01	97.5% KM (Chebyshev)
Benzo(a)pyrene	3.48E-01		7.63E-01	97.5% KM (Chebyshev)
Benzo(b)fluoranthene	4.77E-01		8.22E-01	95% KM (Chebyshev)
Benzo(k)fluoranthene	1.58E-01		3.81E-01	97.5% KM (Chebyshev)
Dibenz(a,h)anthracene	1.48E-01		1.80E-01	95% KM (Bootstrap)
Dieldrin	8.89E-04		2.11E-03	97.5% KM (Chebyshev)
Indeno(1,2,3-cd)pyrene	3.85E-01		6.58E-01	95% KM (Chebyshev)
Iron	1.43E+04		1.75E+04	95% Chebyshev
Isopropylbenzene (cumene)	8.31E-01		5.85E+00	97.5% KM (Chebyshev)
Lead	5.35E+01		1.04E+02	97.5% Chebyshev
Napthalene	3.26E-01	<	2.65E-03	median

TABLE C-2
EXPOSURE POINT CONCENTATION (mg/kg) FOR COPCs
SURFACE SOIL SOUTH OF MARLIN AVE.

Parameter	Average		95% UCL	Statistic Used
4,4-DDD	3.07E-03	<	2.70E-04	median
Aluminum	5.34E+03		5.95E+03	95% Student's-t
Aroclor-1254	1.46E-01		7.64E-01	97.5% KM (Chebyshev)
Benzo(a)anthracene	3.57E-01		9.03E-01	97.5% KM (Chebyshev)
Benzo(a)pyrene	4.53E-01		1.09E+00	97.5% KM (Chebyshev)
Benzo(b)fluoranthene	5.88E-01		1.10E+00	95% KM (Chebyshev)
Benzo(k)fluoranthene	2.44E-01		6.58E-01	97.5% KM (Chebyshev)
Dibenz(a,h)anthracene	1.87E-01		2.45E-01	95% KM (Bootstrap)
Dieldrin	1.40E-03		3.14E-03	97.5% KM (Chebyshev)
Indeno(1,2,3-cd)pyrene	4.83E-01		9.31E-01	95% KM (Chebyshev)
Iron	1.63E+04		2.40E+04	97.5% Chebyshev
Isopropylbenzene (cumene)				
Lead	6.96E+01		1.47E+02	97.5% Chebyshev
Napthalene				

TABLE C-2.5
CALCULATION OF OUTDOOR AIR CONCENTRATION FROM EXPOSED SOIL - VOLATILE EMISSIONS

$$De = \frac{H' * Da * na^{3.33}/n^2 + Dw * nw^{3.33}/n^2}{Pb * Kd + nw + na * H'}$$

$$VF = \frac{(3.14 * De * T)^{0.5} * Q/C}{(2 * Pb * De) * CF}$$

Kd = Foc * Koc

na = n - nw

Source: EPA, 1996

Parameter	Definition	Value	Reference
Da	Diffusion coefficent in air (cm^2/sec)	see below	EPA, 1996
Dw	Diffusion coefficent in water (cm^2/sec)	see below	EPA, 1996
De	Effective diffusion coefficient (cm^2/sec)	see below	calculated
VF	Volatilization Factor (m3/kg)	see below	calculated
n	Total porosity (dimensionless)	0.35	TNRCC, 1993
nw	Water filled soil porosity (dimensionless)	0.15	EPA, 1996
na	Air filled soil porosity (dimensionless)	0.2	n-nw
H'	Henry's law constant (dimensionless)	see below	TRRP
Pb	Dry Bulk Density (g/cm^3)	1.5	EPA, 1996
Foc	Fraction organic carbon (g/g)	0.006	EPA, 1996
Koc	Organic carbon-water partition coefficient (cm^3/g)	see below	EPA, 1996
Kd	Soil-water partition coefficient (cm^3/g)	see below	calculated
CF	Conversion factor (cm^2/m^2)	1.00E+04	standard
Q/C	Inverse of the mean conc. at center of source (g/m^2-s per kg/m^3)	see below	EPA, 1996
T	Exposure interval (sec)	see below	EPA, 1996

Chemical	Da	Dw	De	H'	Koc	Kd	Q/C	T	VF
Isopropylbenzene (cumene)	7.50E-02	7.80E-06	1.14E-05	7.89E-03	2.04E+02	1.224	68.81	9.50E+08	3.71E+04

TABLE C-3
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
AVERAGE -- YOUTH TRESPASSER

SOIL INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see data page	
Ac	Air concentration (mg/m^3)	see below	
EAC	Effective air concentration (mg/m^3)	calculated	
PEF	Particulate Emission Factor (m^3/kg)	1.00E+09	EPA, 2004a
IR	Ingestion rate of soil (mg/day)	100	TNRCC, 1998
SA	Skin surface area (cm2)	3500	TNRCC, 1998
AF	Soil to skin adherence factor (mg/cm2)	0.1	TNRCC, 1998
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	25	professional judgment
ED	Exposure duration (yr)	6	professional judgment
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	40	EPA, 1991a
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	9125	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
4,4-DDD	7.76E-03	1.14E-10	3.19E-10
Aluminum	6.45E+03	9.47E-05	2.65E-04
Aroclor-1254	2.16E-01	3.17E-09	8.88E-09
Benzo(a)anthracene	2.69E-01	3.95E-09	1.11E-08
Benzo(a)pyrene	3.48E-01	5.11E-09	1.43E-08
Benzo(b)fluoranthene	4.77E-01	7.00E-09	1.96E-08
Benzo(k)fluoranthene	1.58E-01	2.32E-09	6.49E-09
Dibenz(a,h)anthracene	1.48E-01	2.17E-09	6.08E-09
Dieldrin	8.89E-04	1.30E-11	3.65E-11
Indeno(1,2,3-cd)pyrene	3.85E-01	5.65E-09	1.58E-08
Iron	1.43E+04	2.10E-04	5.87E-04
Isopropylbenzene (cumene)	8.31E-01	1.22E-08	3.42E-08
Lead	5.35E+01	7.86E-07	2.20E-06
Napthalene	3.26E-01	4.78E-09	1.34E-08

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
4,4-DDD	1.30E-01	7.76E-03	5.18E-11	1.45E-10
Aluminum	1.00E-02	6.45E+03	3.31E-06	9.28E-06
Aroclor-1254	1.40E-01	2.16E-01	1.55E-09	4.35E-09
Benzo(a)anthracene	1.30E-01	2.69E-01	1.80E-09	5.03E-09
Benzo(a)pyrene	1.30E-01	3.48E-01	2.32E-09	6.51E-09
Benzo(b)fluoranthene	1.30E-01	4.77E-01	3.19E-09	8.92E-09
Benzo(k)fluoranthene	1.30E-01	1.58E-01	1.06E-09	2.95E-09
Dibenz(a,h)anthracene	1.30E-01	1.48E-01	9.88E-10	2.77E-09
Dieldrin	1.30E-01	8.89E-04	5.94E-12	1.66E-11
Indeno(1,2,3-cd)pyrene	1.30E-01	3.85E-01	2.57E-09	7.20E-09
Iron	1.00E-02	1.43E+04	7.33E-06	2.05E-05
Isopropylbenzene (cumene)	1.30E-01	8.31E-01	5.55E-09	1.55E-08
Lead	1.00E-02	5.35E+01	2.75E-08	7.70E-08
Napthalene	1.30E-01	3.26E-01	2.18E-09	6.10E-09

INHALATION PATHWAY

Ac = Sc * (1/PEF+1/VF)
EAC = (Ac * EF * ED) / AT *for carcinogens, a conversion is necessary to get into proper units, ug/m3

Chemical	Sc	VF	Ac	EAC for Carcinogens	EAC for Noncarcinogens
4,4-DDD	3.07E-03		3.07E-12	1.80E-11	5.05E-14
Aluminum	5.34E+03		5.34E-06	3.13E-05	8.77E-08
Aroclor-1254	1.46E-01		1.46E-10	8.57E-10	2.40E-12
Benzo(a)anthracene	3.57E-01		3.57E-10	2.10E-09	5.87E-12
Benzo(a)pyrene	4.53E-01		4.53E-10	2.66E-09	7.45E-12
Benzo(b)fluoranthene	5.88E-01		5.88E-10	3.45E-09	9.67E-12
Benzo(k)fluoranthene	2.44E-01		2.44E-10	1.43E-09	4.01E-12
Dibenz(a,h)anthracene	1.87E-01		1.87E-10	1.10E-09	3.07E-12
Dieldrin	1.40E-03		1.40E-12	8.22E-12	2.30E-14
Indeno(1,2,3-cd)pyrene	4.83E-01		4.83E-10	2.84E-09	7.94E-12
Iron	1.63E+04		1.63E-05	9.56E-05	2.68E-07
Isopropylbenzene (cumene)	8.31E-01	3.71E+04	2.24E-05	1.32E-04	3.69E-07
Lead	6.96E+01		6.96E-08	4.09E-07	1.14E-09
Napthalene	3.26E-01		3.26E-10	1.91E-09	5.36E-12

TABLE C-4
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
RME -- YOUTH TRESPASSER (age 6 to 18)

SOIL INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see data page	
Ac	Air concentration (mg/m^3)	see below	
EAC	Effective air concentration (mg/m^3)	calculated	
PEF	Particulate Emission Factor (m^3/kg)	1.00E+09	EPA, 2004a
IR	Ingestion rate of soil (mg/day)	100	TNRCC, 1998
SA	Skin surface area (cm2)	3500	TNRCC, 1998
AF	Soil to skin adherence factor (mg/cm2)	0.1	TNRCC, 1998
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	50	TNRCC, 1998
ED	Exposure duration (yr)	12	TNRCC, 1998
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	40	EPA, 1991a
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	9125	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
4,4-DDD	5.08E-02	2.98E-09	8.35E-09
Aluminum	8.20E+03	4.81E-04	1.35E-03
Aroclor-1254	7.73E-01	4.54E-08	1.27E-07
Benzo(a)anthracene	6.43E-01	3.77E-08	1.06E-07
Benzo(a)pyrene	7.63E-01	4.48E-08	1.25E-07
Benzo(b)fluoranthene	8.22E-01	4.83E-08	1.35E-07
Benzo(k)fluoranthene	3.81E-01	2.24E-08	6.26E-08
Dibenz(a,h)anthracene	1.80E-01	1.06E-08	2.96E-08
Dieldrin	2.11E-03	1.24E-10	3.47E-10
Indeno(1,2,3-cd)pyrene	6.58E-01	3.86E-08	1.08E-07
Iron	1.75E+04	1.02E-03	2.87E-03
Isopropylbenzene (cumene)	5.85E+00	3.43E-07	9.61E-07
Lead	1.04E+02	6.11E-06	1.71E-05
Napthalene	2.65E-03	1.56E-10	4.36E-10

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
4,4-DDD	1.30E-01	5.08E-02	1.36E-09	3.80E-09
Aluminum	1.00E-02	8.20E+03	1.68E-05	4.72E-05
Aroclor-1254	1.40E-01	7.73E-01	2.22E-08	6.23E-08
Benzo(a)anthracene	1.30E-01	6.43E-01	1.72E-08	4.81E-08
Benzo(a)pyrene	1.30E-01	7.63E-01	2.04E-08	5.71E-08
Benzo(b)fluoranthene	1.30E-01	8.22E-01	2.20E-08	6.15E-08
Benzo(k)fluoranthene	1.30E-01	3.81E-01	1.02E-08	2.85E-08
Dibenz(a,h)anthracene	1.30E-01	1.80E-01	4.81E-09	1.35E-08
Dieldrin	1.30E-01	2.11E-03	5.64E-11	1.58E-10
Indeno(1,2,3-cd)pyrene	1.30E-01	6.58E-01	1.76E-08	4.92E-08
Iron	1.00E-02	1.75E+04	3.59E-05	1.00E-04
Isopropylbenzene (cumene)	1.30E-01	5.85E+00	1.56E-07	4.37E-07
Lead	1.00E-02	1.04E+02	2.14E-07	5.98E-07
Napthalene	1.30E-01	2.65E-03	7.08E-11	1.98E-10

INHALATION PATHWAY

Ac = Sc * (1/PEF+1/VF)
EAC = (Ac * EF * ED) / AT *for carcinogens, a conversion is necessary to get into proper units, ug/m3

Chemical	Sc	VF	Ac	EAC for Carcinogens	EAC for Noncarcinogens
4,4-DDD	2.70E-04		2.70E-13	6.34E-12	1.78E-14
Aluminum	5.95E+03		5.95E-06	1.40E-04	3.91E-07
Aroclor-1254	7.64E-01		7.64E-10	1.79E-08	5.02E-11
Benzo(a)anthracene	9.03E-01		9.03E-10	2.12E-08	5.94E-11
Benzo(a)pyrene	1.09E+00		1.09E-09	2.55E-08	7.13E-11
Benzo(b)fluoranthene	1.10E+00		1.10E-09	2.59E-08	7.25E-11
Benzo(k)fluoranthene	6.58E-01		6.58E-10	1.55E-08	4.33E-11
Dibenz(a,h)anthracene	2.45E-01		2.45E-10	5.75E-09	1.61E-11
Dieldrin	3.14E-03		3.14E-12	7.37E-11	2.06E-13
Indeno(1,2,3-cd)pyrene	9.31E-01		9.31E-10	2.19E-08	6.12E-11
Iron	2.40E+04		2.40E-05	5.63E-04	1.58E-06
Isopropylbenzene (cumene)	5.85E+00	3.71E+04	1.58E-04	3.71E-03	1.04E-05
Lead	1.47E+02		1.47E-07	3.45E-06	9.66E-09
Napthalene	2.65E-03		2.65E-12	6.22E-11	1.74E-13

TABLE C-5
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
AVERAGE – CONSTRUCTION WORKER

SOIL INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see data page	
Ac	Air concentration (mg/m^3)	see below	
EAC	Effective air concentration (mg/m^3)	calculated	
PEF	Particulate Emission Factor (m^3/kg)	1.00E+09	EPA, 2004a
IR	Ingestion rate of soil (mg/day)	165	professional judgment
SA	Skin surface area (cm2)	3300	EPA, 2004a
AF	Soil to skin adherence factor (mg/cm2)	0.14	EPA, 2004b
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	90	professional judgment
ED	Exposure duration (yr)	1	professional judgment
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	70	EPA, 1989
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	365	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
4,4-DDD	7.76E-03	6.44E-11	4.51E-09
Aluminum	6.45E+03	5.36E-05	3.75E-03
Aroclor-1254	2.16E-01	1.79E-09	1.26E-07
Benzo(a)anthracene	2.69E-01	2.23E-09	1.56E-07
Benzo(a)pyrene	3.48E-01	2.89E-09	2.02E-07
Benzo(b)fluoranthene	4.77E-01	3.96E-09	2.77E-07
Benzo(k)fluoranthene	1.58E-01	1.31E-09	9.18E-08
Dibenz(a,h)anthracene	1.48E-01	1.23E-09	8.60E-08
Dieldrin	8.89E-04	7.38E-12	5.17E-10
Indeno(1,2,3-cd)pyrene	3.85E-01	3.20E-09	2.24E-07
Iron	1.43E+04	1.19E-04	8.30E-03
Isopropylbenzene (cumene)	8.31E-01	6.90E-09	4.83E-07
Lead	5.35E+01	4.44E-07	3.11E-05
Napthalene	3.26E-01	2.71E-09	1.89E-07

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
4,4-DDD	1.30E-01	7.76E-03	2.35E-11	1.64E-09
Aluminum	1.00E-02	6.45E+03	1.50E-06	1.05E-04
Aroclor-1254	1.40E-01	2.16E-01	7.03E-10	4.92E-08
Benzo(a)anthracene	1.30E-01	2.69E-01	8.13E-10	5.69E-08
Benzo(a)pyrene	1.30E-01	3.48E-01	1.05E-09	7.36E-08
Benzo(b)fluoranthene	1.30E-01	4.77E-01	1.44E-09	1.01E-07
Benzo(k)fluoranthene	1.30E-01	1.58E-01	4.78E-10	3.34E-08
Dibenz(a,h)anthracene	1.30E-01	1.48E-01	4.47E-10	3.13E-08
Dieldrin	1.30E-01	8.89E-04	2.69E-12	1.88E-10
Indeno(1,2,3-cd)pyrene	1.30E-01	3.85E-01	1.16E-09	8.15E-08
Iron	1.00E-02	1.43E+04	3.32E-06	2.32E-04
Isopropylbenzene (cumene)	1.30E-01	8.31E-01	2.51E-09	1.76E-07
Lead	1.00E-02	5.35E+01	1.24E-08	8.71E-07
Napthalene	1.30E-01	3.26E-01	9.85E-10	6.90E-08

INHALATION PATHWAY

Ac = Sc * (1/PEF+1/VF)
EAC = (Ac * EF * ED) / AT *for carcinogens, a conversion is necessary to get into proper units, ug/m3

Chemical	Sc	VF	Ac	EAC for Carcinogens	EAC for Noncarcinogens
4,4-DDD	3.07E-03		3.07E-12	1.08E-11	7.57E-13
Aluminum	5.34E+03		5.34E-06	1.88E-05	1.32E-06
Aroclor-1254	1.46E-01		1.46E-10	5.14E-10	3.60E-11
Benzo(a)anthracene	3.57E-01		3.57E-10	1.26E-09	8.80E-11
Benzo(a)pyrene	4.53E-01		4.53E-10	1.60E-09	1.12E-10
Benzo(b)fluoranthene	5.88E-01		5.88E-10	2.07E-09	1.45E-10
Benzo(k)fluoranthene	2.44E-01		2.44E-10	8.59E-10	6.02E-11
Dibenz(a,h)anthracene	1.87E-01		1.87E-10	6.59E-10	4.61E-11
Dieldrin	1.40E-03		1.40E-12	4.93E-12	3.45E-13
Indeno(1,2,3-cd)pyrene	4.83E-01		4.83E-10	1.70E-09	1.19E-10
Iron	1.63E+04		1.63E-05	5.74E-05	4.02E-06
Isopropylbenzene (cumene)	8.31E-01	3.71E+04	2.24E-05	7.90E-05	5.53E-06
Lead	6.96E+01		6.96E-08	2.45E-07	1.72E-08
Napthalene	3.26E-01		3.26E-10	1.15E-09	8.04E-11

TABLE C-6
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
RME -- CONSTRUCTION WORKER

SOIL INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see data page	
Ac	Air concentration (mg/m^3)	see below	
EAC	Effective air concentration (mg/m^3)	calculated	
PEF	Particulate Emission Factor (m^3/kg)	1.00E+09	EPA, 2004a
IR	Ingestion rate of soil (mg/day)	330	EPA, 2001
SA	Skin surface area (cm2)	3300	EPA, 2004a
AF	Soil to skin adherence factor (mg/cm2)	0.3	EPA, 2004b
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	250	professional judgment
ED	Exposure duration (yr)	1	professional judgment
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	70	EPA, 1989
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	365	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
4,4-DDD	5.08E-02	2.34E-09	1.64E-07
Aluminum	8.20E+03	3.78E-04	2.65E-02
Aroclor-1254	7.73E-01	3.57E-08	2.50E-06
Benzo(a)anthracene	6.43E-01	2.97E-08	2.08E-06
Benzo(a)pyrene	7.63E-01	3.52E-08	2.46E-06
Benzo(b)fluoranthene	8.22E-01	3.79E-08	2.65E-06
Benzo(k)fluoranthene	3.81E-01	1.76E-08	1.23E-06
Dibenz(a,h)anthracene	1.80E-01	8.30E-09	5.81E-07
Dieldrin	2.11E-03	9.73E-11	6.81E-09
Indeno(1,2,3-cd)pyrene	6.58E-01	3.04E-08	2.12E-06
Iron	1.75E+04	8.05E-04	5.64E-02
Isopropylbenzene (cumene)	5.85E+00	2.70E-07	1.89E-05
Lead	1.04E+02	4.80E-06	3.36E-04
Napthalene	2.65E-03	1.22E-10	8.56E-09

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
4,4-DDD	1.30E-01	5.08E-02	9.14E-10	6.40E-08
Aluminum	1.00E-02	8.20E+03	1.13E-05	7.94E-04
Aroclor-1254	1.40E-01	7.73E-01	1.50E-08	1.05E-06
Benzo(a)anthracene	1.30E-01	6.43E-01	1.16E-08	8.10E-07
Benzo(a)pyrene	1.30E-01	7.63E-01	1.37E-08	9.61E-07
Benzo(b)fluoranthene	1.30E-01	8.22E-01	1.48E-08	1.04E-06
Benzo(k)fluoranthene	1.30E-01	3.81E-01	6.85E-09	4.80E-07
Dibenz(a,h)anthracene	1.30E-01	1.80E-01	3.24E-09	2.27E-07
Dieldrin	1.30E-01	2.11E-03	3.80E-11	2.66E-09
Indeno(1,2,3-cd)pyrene	1.30E-01	6.58E-01	1.18E-08	8.29E-07
Iron	1.00E-02	1.75E+04	2.42E-05	1.69E-03
Isopropylbenzene (cumene)	1.30E-01	5.85E+00	1.05E-07	7.36E-06
Lead	1.00E-02	1.04E+02	1.44E-07	1.01E-05
Napthalene	1.30E-01	2.65E-03	4.77E-11	3.34E-09

INHALATION PATHWAY

Ac = Sc * (1/PEF+ 1/VF)
EAC = (Ac * EF * ED) / AT *for carcinogens, a conversion is necessary to get into proper units, ug/m3

Chemical	Sc	VF	Ac	EAC for Carcinogens	EAC for Noncarcinogens
4,4-DDD	2.70E-04		2.70E-13	2.64E-12	1.85E-13
Aluminum	5.95E+03		5.95E-06	5.82E-05	4.07E-06
Aroclor-1254	7.64E-01		7.64E-10	7.48E-09	5.23E-10
Benzo(a)anthracene	9.03E-01		9.03E-10	8.84E-09	6.18E-10
Benzo(a)pyrene	1.09E+00		1.09E-09	1.06E-08	7.43E-10
Benzo(b)fluoranthene	1.10E+00		1.10E-09	1.08E-08	7.55E-10
Benzo(k)fluoranthene	6.58E-01		6.58E-10	6.44E-09	4.51E-10
Dibenz(a,h)anthracene	2.45E-01		2.45E-10	2.40E-09	1.68E-10
Dieldrin	3.14E-03		3.14E-12	3.07E-11	2.15E-12
Indeno(1,2,3-cd)pyrene	9.31E-01		9.31E-10	9.11E-09	6.38E-10
Iron	2.40E+04		2.40E-05	2.34E-04	1.64E-05
Isopropylbenzene (cumene)	5.85E+00	3.71E+04	1.58E-04	1.54E-03	1.08E-04
Lead	1.47E+02		1.47E-07	1.44E-06	1.01E-07
Napthalene	2.65E-03		2.65E-12	2.59E-11	1.82E-12

TABLE C-7
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
AVERAGE – INDUSTRIAL WORKER

SOIL INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see data page	
Ac	Air concentration (mg/m^3)	see below	
EAC	Effective air concentration (mg/m^3)	calculated	
PEF	Particulate Emission Factor (m^3/kg)	1.00E+09	EPA, 2004a
IR	Ingestion rate of soil (mg/day)	50	EPA, 2004a
SA	Skin surface area (cm2)	3300	EPA, 2004a
AF	Soil to skin adherence factor (mg/cm2)	0.021	EPA, 2004a
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	250	EPA, 2004a
ED	Exposure duration (yr)	25	EPA, 2004a
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	70	EPA, 1989
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	9125	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
4,4-DDD	7.76E-03	1.36E-09	3.80E-09
Aluminum	6.45E+03	1.13E-03	3.16E-03
Aroclor-1254	2.16E-01	3.77E-08	1.06E-07
Benzo(a)anthracene	2.69E-01	4.70E-08	1.32E-07
Benzo(a)pyrene	3.48E-01	6.08E-08	1.70E-07
Benzo(b)fluoranthene	4.77E-01	8.33E-08	2.33E-07
Benzo(k)fluoranthene	1.58E-01	2.76E-08	7.73E-08
Dibenz(a,h)anthracene	1.48E-01	2.59E-08	7.24E-08
Dieldrin	8.89E-04	1.55E-10	4.35E-10
Indeno(1,2,3-cd)pyrene	3.85E-01	6.73E-08	1.88E-07
Iron	1.43E+04	2.49E-03	6.98E-03
Isopropylbenzene (cumene)	8.31E-01	1.45E-07	4.07E-07
Lead	5.35E+01	9.35E-06	2.62E-05
Napthalene	3.26E-01	5.70E-08	1.59E-07

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
4,4-DDD	1.30E-01	7.76E-03	2.44E-10	6.84E-10
Aluminum	1.00E-02	6.45E+03	1.56E-05	4.37E-05
Aroclor-1254	1.40E-01	2.16E-01	7.32E-09	2.05E-08
Benzo(a)anthracene	1.30E-01	2.69E-01	8.47E-09	2.37E-08
Benzo(a)pyrene	1.30E-01	3.48E-01	1.10E-08	3.07E-08
Benzo(b)fluoranthene	1.30E-01	4.77E-01	1.50E-08	4.20E-08
Benzo(k)fluoranthene	1.30E-01	1.58E-01	4.97E-09	1.39E-08
Dibenz(a,h)anthracene	1.30E-01	1.48E-01	4.66E-09	1.30E-08
Dieldrin	1.30E-01	8.89E-04	2.80E-11	7.84E-11
Indeno(1,2,3-cd)pyrene	1.30E-01	3.85E-01	1.21E-08	3.39E-08
Iron	1.00E-02	1.43E+04	3.46E-05	9.68E-05
Isopropylbenzene (cumene)	1.30E-01	8.31E-01	2.62E-08	7.33E-08
Lead	1.00E-02	5.35E+01	1.30E-07	3.63E-07
Napthalene	1.30E-01	3.26E-01	1.03E-08	2.87E-08

INHALATION PATHWAY

Ac = Sc * (1/PEF+ 1/VF)
EAC = (Ac * EF * ED) / AT *for carcinogens, a conversion is necessary to get into proper units, ug/m3

Chemical	Sc	VF	Ac	EAC for Carcinogens	EAC for Noncarcinogens
4,4-DDD	3.07E-03		3.07E-12	7.51E-10	2.10E-12
Aluminum	5.34E+03		5.34E-06	1.31E-03	3.65E-06
Aroclor-1254	1.46E-01		1.46E-10	3.57E-08	1.00E-10
Benzo(a)anthracene	3.57E-01		3.57E-10	8.73E-08	2.45E-10
Benzo(a)pyrene	4.53E-01		4.53E-10	1.11E-07	3.10E-10
Benzo(b)fluoranthene	5.88E-01		5.88E-10	1.44E-07	4.03E-10
Benzo(k)fluoranthene	2.44E-01		2.44E-10	5.97E-08	1.67E-10
Dibenz(a,h)anthracene	1.87E-01		1.87E-10	4.57E-08	1.28E-10
Dieldrin	1.40E-03		1.40E-12	3.42E-10	9.59E-13
Indeno(1,2,3-cd)pyrene	4.83E-01		4.83E-10	1.18E-07	3.31E-10
Iron	1.63E+04		1.63E-05	3.98E-03	1.12E-05
Isopropylbenzene (cumene)	8.31E-01	3.71E+04	2.24E-05	5.49E-03	1.54E-05
Lead	6.96E+01		6.96E-08	1.70E-05	4.77E-08
Napthalene	3.26E-01		3.26E-10	7.97E-08	2.23E-10

TABLE C-8
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
RME -- INDUSTRIAL WORKER

SOIL INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see data page	
Ac	Air concentration (mg/m^3)	see below	
EAC	Effective air concentration (mg/m^3)	calculated	
PEF	Particulate Emission Factor (m^3/kg)	1.00E+09	EPA, 2004a
IR	Ingestion rate of soil (mg/day)	50	EPA, 2004a
SA	Skin surface area (cm2)	3300	EPA, 2004a
AF	Soil to skin adherence factor (mg/cm2)	0.2	EPA, 2004a
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	250	EPA, 2004a
ED	Exposure duration (yr)	25	EPA, 2004a
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	70	EPA, 1989
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	9125	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
4,4-DDD	5.08E-02	8.88E-09	2.49E-08
Aluminum	8.20E+03	1.43E-03	4.01E-03
Aroclor-1254	7.73E-01	1.35E-07	3.78E-07
Benzo(a)anthracene	6.43E-01	1.12E-07	3.15E-07
Benzo(a)pyrene	7.63E-01	1.33E-07	3.73E-07
Benzo(b)fluoranthene	8.22E-01	1.44E-07	4.02E-07
Benzo(k)fluoranthene	3.81E-01	6.66E-08	1.86E-07
Dibenz(a,h)anthracene	1.80E-01	3.15E-08	8.81E-08
Dieldrin	2.11E-03	3.69E-10	1.03E-09
Indeno(1,2,3-cd)pyrene	6.58E-01	1.15E-07	3.22E-07
Iron	1.75E+04	3.05E-03	8.54E-03
Isopropylbenzene (cumene)	5.85E+00	1.02E-06	2.86E-06
Lead	1.04E+02	1.82E-05	5.09E-05
Napthalene	2.65E-03	4.63E-10	1.30E-09

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
4,4-DDD	1.30E-01	5.08E-02	1.52E-08	4.26E-08
Aluminum	1.00E-02	8.20E+03	1.89E-04	5.29E-04
Aroclor-1254	1.40E-01	7.73E-01	2.50E-07	6.99E-07
Benzo(a)anthracene	1.30E-01	6.43E-01	1.93E-07	5.40E-07
Benzo(a)pyrene	1.30E-01	7.63E-01	2.29E-07	6.41E-07
Benzo(b)fluoranthene	1.30E-01	8.22E-01	2.46E-07	6.90E-07
Benzo(k)fluoranthene	1.30E-01	3.81E-01	1.14E-07	3.20E-07
Dibenz(a,h)anthracene	1.30E-01	1.80E-01	5.40E-08	1.51E-07
Dieldrin	1.30E-01	2.11E-03	6.33E-10	1.77E-09
Indeno(1,2,3-cd)pyrene	1.30E-01	6.58E-01	1.97E-07	5.52E-07
Iron	1.00E-02	1.75E+04	4.03E-04	1.13E-03
Isopropylbenzene (cumene)	1.30E-01	5.85E+00	1.75E-06	4.91E-06
Lead	1.00E-02	1.04E+02	2.40E-06	6.72E-06
Napthalene	1.30E-01	2.65E-03	7.95E-10	2.22E-09

INHALATION PATHWAY

Ac = Sc * (1/PEF + 1/VF)
EAC = (Ac * EF * ED) / AT *for carcinogens, a conversion is necessary to get into proper units, ug/m3

Chemical	Sc	VF	Ac	EAC for Carcinogens	EAC for Noncarcinogens
4,4-DDD	2.70E-04		2.70E-13	6.60E-11	1.85E-13
Aluminum	5.95E+03		5.95E-06	1.45E-03	4.07E-06
Aroclor-1254	7.64E-01		7.64E-10	1.87E-07	5.23E-10
Benzo(a)anthracene	9.03E-01		9.03E-10	2.21E-07	6.18E-10
Benzo(a)pyrene	1.09E+00		1.09E-09	2.65E-07	7.43E-10
Benzo(b)fluoranthene	1.10E+00		1.10E-09	2.70E-07	7.55E-10
Benzo(k)fluoranthene	6.58E-01		6.58E-10	1.61E-07	4.51E-10
Dibenz(a,h)anthracene	2.45E-01		2.45E-10	5.99E-08	1.68E-10
Dieldrin	3.14E-03		3.14E-12	7.68E-10	2.15E-12
Indeno(1,2,3-cd)pyrene	9.31E-01		9.31E-10	2.28E-07	6.38E-10
Iron	2.40E+04		2.40E-05	5.86E-03	1.64E-05
Isopropylbenzene (cumene)	5.85E+00	3.71E+04	1.58E-04	3.86E-02	1.08E-04
Lead	1.47E+02		1.47E-07	3.59E-05	1.01E-07
Napthalene	2.65E-03		2.65E-12	6.48E-10	1.82E-12

APPENDIX C-2

INTAKE CALCULATIONS

NORTH OF MARLIN SOIL

TABLE C-9
EXPOSURE POINT CONCENTATION (mg/kg) FOR COPCs
SOIL NORTH OF MARLIN AVE.

Parameter	Average		95% UCL	Statistic Used
1,2-Dichloroethane	1.95E-02	<	1.27E-04	median
Aluminum	1.23E+04		1.33E+04	95% Student's-t
Aroclor-1254	1.81E-01	<	4.30E-03	median
Benzo(a)anthracene	1.09E-01	<	1.11E-02	median
Benzo(a)pyrene	9.37E-02		3.78E-01	97.5% KM (Chebyshev)
Benzo(b)fluoranthene	1.44E-01		2.52E-01	95% KM (Bootstrap)
Dibenz(a,h)anthracene	6.88E-02	<	1.08E-02	median
Indeno(1,2,3-cd)pyrene	1.15E-01		3.96E-01	97.5% KM (Chebyshev)
Iron	2.09E+04		3.69E+04	95% Chebyshev
Tetrachloroethene	1.26E-02	<	2.11E-04	median

TABLE C-10
EXPOSURE POINT CONCENTATION (mg/kg) FOR COPCs
SURFACE SOIL NORTH OF MARLIN AVE.

Parameter	Average		95% UCL	Statistic Used
1,2-Dichloroethane	0		0	NS
Aluminum	1.07E+04		1.22E+04	95% Student's-t
Aroclor-1254	1.22E-02	<	4.29E-03	median
Benzo(a)anthracene	1.18E+00	<	1.10E-02	median
Benzo(a)pyrene	1.19E-01	<	1.16E-02	median
Benzo(b)fluoranthene	1.69E-01		3.73E-01	95% KM (BCA)
Dibenz(a,h)anthracene	7.69E-02	<	1.10E-02	median
Indeno(1,2,3-cd)pyrene	1.55E-01		6.82E-01	97.5% KM (Chebyshev)
Iron	1.95E+04		4.11E+04	95% Chebyshev
Tetrachloroethene	0		0	NS

Notes:
NS -- Not Sampled in surface soil.

TABLE C-11
CALCULATION OF OUTDOOR AIR CONCENTRATION FROM EXPOSED SOIL - VOLATILE EMISSIONS

$$De = \frac{H' * Da * na^{3.33}/n^2 + Dw * nw^{3.33}/n^2}{Pb * Kd + nw + na * H'}$$

$$VF = \frac{(3.14 * De * T)^{0.5} * Q/C}{(2 * Pb * De) * CF}$$

Kd = Foc * Koc

na = n - nw

Source: EPA, 1996

Parameter	Definition	Value	Reference
Da	Diffusion coefficent in air (cm^2/sec)	see below	EPA, 1996
Dw	Diffusion coefficent in water (cm^2/sec)	see below	EPA, 1996
De	Effective diffusion coefficient (cm^2/sec)	see below	calculated
VF	Volatilization Factor (m3/kg)	see below	calculated
n	Total porosity (dimensionless)	0.35	TNRCC, 1993
nw	Water filled soil porosity (dimensionless)	0.15	EPA, 1996
na	Air filled soil porosity (dimensionless)	0.2	n-nw
H'	Henry's law constant (dimensionless)	see below	TRRP
Pb	Dry Bulk Density (g/cm^3)	1.5	EPA, 1996
Foc	Fraction organic carbon (g/g)	0.006	EPA, 1996
Koc	Organic carbon-water partition coefficient (cm^3/g)	see below	EPA, 1996
Kd	Soil-water partition coefficient (cm^3/g)	see below	calculated
CF	Conversion factor (cm^2/m^2)	1.00E+04	standard
Q/C	Inverse of the mean conc. at center of source (g/m^2-s per kg/m^3)	see below	EPA, 1996
T	Exposure interval (sec)	see below	EPA, 1996

Chemical	Da	Dw	De	H'	Koc	Kd	Q/C	T	VF
1,2-Dichloroethane	7.10E-02	7.90E-06	7.86E-05	1.58E-02	4.37E+01	0.2622	68.81	9.50E+08	1.41E+04
Tetrachloroethene	7.20E-02	8.20E-06	6.84E-03	7.65E+00	1.55E+02	0.93	68.81	9.50E+08	1.51E+03

TABLE C-12
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
AVERAGE -- YOUTH TRESPASSER

SOIL INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see data page	
Ac	Air concentration (mg/m^3)	see below	
EAC	Effective air concentration (mg/m^3)	calculated	
PEF	Particulate Emission Factor (m^3/kg)	1.00E+09	EPA, 2004a
VF	Volatilization Factor (m^3/kg)	calculated	EPA, 1996
IR	Ingestion rate of soil (mg/day)	100	TNRCC, 1998
SA	Skin surface area (cm2)	3500	TNRCC, 1998
AF	Soil to skin adherence factor (mg/cm2)	0.1	TNRCC, 1998
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	25	professional judgment
ED	Exposure duration (yr)	6	professional judgment
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	40	EPA, 1991a
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	9125	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
1,2-Dichloroethane	1.95E-02	2.86E-10	8.01E-10
Aluminum	1.23E+04	1.80E-04	5.04E-04
Aroclor-1254	1.81E-01	2.66E-09	7.44E-09
Benzo(a)anthracene	1.09E-01	1.60E-09	4.48E-09
Benzo(a)pyrene	9.37E-02	1.38E-09	3.85E-09
Benzo(b)fluoranthene	1.44E-01	2.11E-09	5.92E-09
Dibenz(a,h)anthracene	6.88E-02	1.01E-09	2.83E-09
Indeno(1,2,3-cd)pyrene	1.15E-01	1.69E-09	4.73E-09
Iron	2.09E+04	3.07E-04	8.58E-04
Tetrachloroethene	1.26E-02	1.85E-10	5.18E-10

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
1,2-Dichloroethane	1.30E-01	1.95E-02	1.30E-10	3.65E-10
Aluminum	1.00E-02	1.23E+04	6.30E-06	1.76E-05
Aroclor-1254	1.30E-01	1.81E-01	1.21E-09	3.38E-09
Benzo(a)anthracene	1.30E-01	1.09E-01	7.28E-10	2.04E-09
Benzo(a)pyrene	1.30E-01	9.37E-02	6.26E-10	1.75E-09
Benzo(b)fluoranthene	1.30E-01	1.44E-01	9.62E-10	2.69E-09
Dibenz(a,h)anthracene	1.30E-01	6.88E-02	4.59E-10	1.29E-09
Indeno(1,2,3-cd)pyrene	1.30E-01	1.15E-01	7.68E-10	2.15E-09
Iron	1.00E-02	2.09E+04	1.07E-05	3.00E-05
Tetrachloroethene	1.30E-01	1.26E-02	8.41E-11	2.36E-10

INHALATION PATHWAY

Ac = Sc * (1/PEF+1/VF)
EAC = (Ac * EF * ED) / AT *for carcinogens, a conversion is necessary to get into proper units, ug/m3

Chemical	Sc	VF	Ac	EAC for Carcinogens	EAC for Noncarcinogens
1,2-Dichloroethane	1.95E-02	1.41E+04	1.38E-06	8.10E-06	2.27E-08
Aluminum	1.07E+04		1.07E-05	6.27E-05	1.75E-07
Aroclor-1254	1.22E-02		1.22E-11	7.16E-11	2.01E-13
Benzo(a)anthracene	1.18E+00		1.18E-09	6.93E-09	1.94E-11
Benzo(a)pyrene	1.19E-01		1.19E-10	6.99E-10	1.96E-12
Benzo(b)fluoranthene	1.69E-01		1.69E-10	9.92E-10	2.78E-12
Dibenz(a,h)anthracene	7.69E-02		7.69E-11	4.51E-10	1.26E-12
Indeno(1,2,3-cd)pyrene	1.55E-01		1.55E-10	9.10E-10	2.55E-12
Iron	1.95E+04		1.95E-05	1.14E-04	3.20E-07
Tetrachloroethene	1.26E-02	1.51E+03	8.32E-06	4.88E-05	1.37E-07

TABLE C-13
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
RME -- YOUTH TRESPASSER (age 6 to 18)

SOIL INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see data page	
Ac	Air concentration (mg/m^3)	see below	
EAC	Effective air concentration (mg/m^3)	calculated	
VF	Volatilization Factor (m^3/kg)	calculated	EPA, 1996
PEF	Particulate Emission Factor (m^3/kg)	1.00E+09	EPA, 2004a
IR	Ingestion rate of soil (mg/day)	100	TNRCC, 1998
SA	Skin surface area (cm2)	3500	TNRCC, 1998
AF	Soil to skin adherence factor (mg/cm2)	0.1	TNRCC, 1998
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	50	TNRCC, 1998
ED	Exposure duration (yr)	12	TNRCC, 1998
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	40	EPA, 1991a
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	9125	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
1,2-Dichloroethane	1.27E-04	7.46E-12	2.09E-11
Aluminum	1.33E+04	7.83E-04	2.19E-03
Aroclor-1254	4.30E-03	2.52E-10	7.07E-10
Benzo(a)anthracene	1.11E-02	6.52E-10	1.82E-09
Benzo(a)pyrene	3.78E-01	2.22E-08	6.21E-08
Benzo(b)fluoranthene	2.52E-01	1.48E-08	4.14E-08
Dibenz(a,h)anthracene	1.08E-02	6.34E-10	1.78E-09
Indeno(1,2,3-cd)pyrene	3.96E-01	2.32E-08	6.51E-08
Iron	3.69E+04	2.17E-03	6.06E-03
Tetrachloroethene	2.11E-04	1.24E-11	3.47E-11

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
1,2-Dichloroethane	1.30E-01	1.27E-04	3.39E-12	9.50E-12
Aluminum	1.00E-02	1.33E+04	2.74E-05	7.68E-05
Aroclor-1254	1.30E-01	4.30E-03	1.15E-10	3.22E-10
Benzo(a)anthracene	1.30E-01	1.11E-02	2.97E-10	8.30E-10
Benzo(a)pyrene	1.30E-01	3.78E-01	1.01E-08	2.83E-08
Benzo(b)fluoranthene	1.30E-01	2.52E-01	6.73E-09	1.88E-08
Dibenz(a,h)anthracene	1.30E-01	1.08E-02	2.88E-10	8.08E-10
Indeno(1,2,3-cd)pyrene	1.30E-01	3.96E-01	1.06E-08	2.96E-08
Iron	1.00E-02	3.69E+04	7.58E-05	2.12E-04
Tetrachloroethene	1.30E-01	2.11E-04	5.64E-12	1.58E-11

INHALATION PATHWAY

Ac = Sc * (1/PEF+1/VF)
EAC = (Ac * EF * ED) / AT   *for carcinogens, a conversion is necessary to get into proper units, ug/m3

Chemical	Sc	VF	Ac	EAC for Carcinogens	EAC for Noncarcinogens
1,2-Dichloroethane	1.27E-04	1.41E+04	8.99E-09	2.11E-07	5.91E-10
Aluminum	1.22E+04		1.22E-05	2.86E-04	8.01E-07
Aroclor-1254	4.29E-03		4.29E-12	1.01E-10	2.82E-13
Benzo(a)anthracene	1.10E-02		1.10E-11	2.58E-10	7.23E-13
Benzo(a)pyrene	1.16E-02		1.16E-11	2.72E-10	7.63E-13
Benzo(b)fluoranthene	3.73E-01		3.73E-10	8.76E-09	2.45E-11
Dibenz(a,h)anthracene	1.10E-02		1.10E-11	2.58E-10	7.23E-13
Indeno(1,2,3-cd)pyrene	6.82E-01		6.82E-10	1.60E-08	4.48E-11
Iron	4.11E+04		4.11E-05	9.66E-04	2.70E-06
Tetrachloroethene	2.11E-04	1.51E+03	1.39E-07	3.27E-06	9.16E-09

TABLE D-10
RISK/HAZARD CALCULATIONS FOR SOIL NORTH OF MARLIN
RME -- YOUTH TRESPASSER (age 6 to 18)

Cancer Risk = Intake*CSF *or* EAC * IUR

HQ = Intake / RfD *or* EAC / RfC

Parameter	Definition	Default
Intake	Intake of chemical (mg/kg-day)	see intake
EAC	Effective Air Concentration (mg/m^3)	see intake
CSF	Cancer slope factor (mg/kg-day)-1	see chemprop
IUR	Inhalation unit risk (ug/m^3)-1	see chemprop
RfD	Reference dose (mg/kg-day)	see chemprop
RfC	Inhalation reference concentration (mg/m^3)	see chemprop

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	9.10E-02	2.00E-02	7.46E-12	2.09E-11	6.78E-13	1.04E-09
Aluminum	--	1.00E-01	7.83E-04	2.19E-03		2.19E-02
Aroclor-1254	2.00E+00	2.00E-05	2.52E-10	7.07E-10	5.05E-10	3.53E-05
Benzo(a)anthracene	7.30E-01	--	6.52E-10	1.82E-09	4.76E-10	
Benzo(a)pyrene	7.30E+00	--	2.22E-08	6.21E-08	1.62E-07	
Benzo(b)fluoranthene	7.30E-01	--	1.48E-08	4.14E-08	1.08E-08	
Dibenz(a,h)anthracene	7.30E+00	--	6.34E-10	1.78E-09	4.63E-09	
Indeno(1,2,3-cd)pyrene	7.30E-01	--	2.32E-08	6.51E-08	1.70E-08	
Iron	--	7.00E-01	2.17E-03	6.06E-03		8.66E-03
Tetrachloroethene	5.20E-02	1.00E-02	1.24E-11	3.47E-11	6.44E-13	3.47E-09
			PATHWAY TOTAL =		1.95E-07	3.06E-02

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	9.10E-02	2.00E-02	3.39E-12	9.50E-12	3.09E-13	4.75E-10
Aluminum	--	1.00E-01	2.74E-05	7.68E-05		7.68E-04
Aroclor-1254	2.00E+00	2.00E-05	1.15E-10	3.22E-10	2.30E-10	1.61E-05
Benzo(a)anthracene	7.30E-01	--	2.97E-10	8.30E-10	2.16E-10	
Benzo(a)pyrene	7.30E+00	--	1.01E-08	2.83E-08	7.37E-08	
Benzo(b)fluoranthene	7.30E-01	--	6.73E-09	1.88E-08	4.91E-09	
Dibenz(a,h)anthracene	7.30E+00	--	2.88E-10	8.08E-10	2.11E-09	
Indeno(1,2,3-cd)pyrene	7.30E-01	--	1.06E-08	2.96E-08	7.72E-09	
Iron	--	7.00E-01	7.58E-05	2.12E-04		3.03E-04
Tetrachloroethene	5.20E-02	1.00E-02	5.64E-12	1.58E-11	2.93E-13	1.58E-09
			PATHWAY TOTAL =		8.89E-08	1.09E-03

INHALATION

Chemical	IUR	RfC	EAC Carc (ug/m3)	EAC Noncarc (mg/m3)	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	2.60E-05	2.40E+00	2.11E-07	5.91E-10	5.49E-12	2.46E-10
Aluminum	--	5.00E-03	2.86E-04	8.01E-07		1.60E-04
Aroclor-1254	5.70E-04	--	1.01E-10	2.82E-13	5.74E-14	
Benzo(a)anthracene	8.80E-05	--	2.58E-10	7.23E-13	2.27E-14	
Benzo(a)pyrene	8.80E-04	--	2.72E-10	7.63E-13	2.40E-13	
Benzo(b)fluoranthene	8.80E-05	--	8.76E-09	2.45E-11	7.71E-13	
Dibenz(a,h)anthracene	8.80E-04	--	2.58E-10	7.23E-13	2.27E-13	
Indeno(1,2,3-cd)pyrene	8.80E-05	--	1.60E-08	4.48E-11	1.41E-12	
Iron	--	--	9.66E-04	2.70E-06		
Tetrachloroethene	5.80E-07	2.70E-01	3.27E-06	9.16E-09	1.90E-12	3.39E-08
			PATHWAY TOTAL =		1.01E-11	1.60E-04
				TOTAL	**2.84E-07**	**3.19E-02**

TABLE C-14
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
AVERAGE -- CONSTRUCTION WORKER

SOIL INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see data page	
Ac	Air concentration (mg/m^3)	see below	
EAC	Effective air concentration (mg/m^3)	calculated	
VF	Volatilization Factor (m^3/kg)	calculated	EPA, 1996
PEF	Particulate Emission Factor (m^3/kg)	1.00E+09	EPA, 2004a
IR	Ingestion rate of soil (mg/day)	165	professional judgment
SA	Skin surface area (cm2)	3300	EPA, 2004a
AF	Soil to skin adherence factor (mg/cm2)	0.14	EPA, 2004b
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	90	professional judgment
ED	Exposure duration (yr)	1	professional judgment
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	70	EPA, 1989
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	365	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
1,2-Dichloroethane	1.95E-02	1.62E-10	1.13E-08
Aluminum	1.23E+04	1.02E-04	7.13E-03
Aroclor-1254	1.81E-01	1.50E-09	1.05E-07
Benzo(a)anthracene	1.09E-01	9.05E-10	6.34E-08
Benzo(a)pyrene	9.37E-02	7.78E-10	5.45E-08
Benzo(b)fluoranthene	1.44E-01	1.20E-09	8.37E-08
Dibenz(a,h)anthracene	6.88E-02	5.71E-10	4.00E-08
Indeno(1,2,3-cd)pyrene	1.15E-01	9.55E-10	6.68E-08
Iron	2.09E+04	1.73E-04	1.21E-02
Tetrachloroethene	1.26E-02	1.05E-10	7.32E-09

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
1,2-Dichloroethane	1.30E-01	1.95E-02	5.89E-11	4.13E-09
Aluminum	1.00E-02	1.23E+04	2.85E-06	2.00E-04
Aroclor-1254	1.30E-01	1.81E-01	5.47E-10	3.83E-08
Benzo(a)anthracene	1.30E-01	1.09E-01	3.29E-10	2.31E-08
Benzo(a)pyrene	1.30E-01	9.37E-02	2.83E-10	1.98E-08
Benzo(b)fluoranthene	1.30E-01	1.44E-01	4.35E-10	3.05E-08
Dibenz(a,h)anthracene	1.30E-01	6.88E-02	2.08E-10	1.46E-08
Indeno(1,2,3-cd)pyrene	1.30E-01	1.15E-01	3.48E-10	2.43E-08
Iron	1.00E-02	2.09E+04	4.86E-06	3.40E-04
Tetrachloroethene	1.30E-01	1.26E-02	3.81E-11	2.67E-09

INHALATION PATHWAY

Ac = Sc * (1/PEF + 1/VF)
EAC = (Ac * EF * ED) / AT *for carcinogens, a conversion is necessary to get into proper units, ug/m3

Chemical	Sc	VF	Ac	EAC for Carcinogens	EAC for Noncarcinogens
1,2-Dichloroethane	1.95E-02	1.41E+04	1.38E-06	4.86E-06	3.40E-07
Aluminum	1.07E+04		1.07E-05	3.76E-05	2.63E-06
Aroclor-1254	1.22E-02		1.22E-11	4.30E-11	3.01E-12
Benzo(a)anthracene	1.18E+00		1.18E-09	4.16E-09	2.91E-10
Benzo(a)pyrene	1.19E-01		1.19E-10	4.19E-10	2.93E-11
Benzo(b)fluoranthene	1.69E-01		1.69E-10	5.95E-10	4.17E-11
Dibenz(a,h)anthracene	7.69E-02		7.69E-11	2.71E-10	1.90E-11
Indeno(1,2,3-cd)pyrene	1.55E-01		1.55E-10	5.46E-10	3.82E-11
Iron	1.95E+04		1.95E-05	6.86E-05	4.80E-06
Tetrachloroethene	1.26E-02	1.51E+03	8.32E-06	2.93E-05	2.05E-06

TABLE C-15
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
RME -- CONSTRUCTION WORKER

SOIL INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see data page	
Ac	Air concentration (mg/m^3)	see below	
EAC	Effective air concentration (mg/m^3)	calculated	
VF	Volatilization Factor (m^3/kg)	calculated	EPA, 1996
PEF	Particulate Emission Factor (m^3/kg)	1.00E+09	EPA, 2004a
IR	Ingestion rate of soil (mg/day)	330	EPA, 2001
SA	Skin surface area (cm2)	3300	EPA, 2004a
AF	Soil to skin adherence factor (mg/cm2)	0.3	EPA, 2001b
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	250	professional judgment
ED	Exposure duration (yr)	1	professional judgment
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	70	EPA, 1989
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	365	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
1,2-Dichloroethane	1.27E-04	5.86E-12	4.10E-10
Aluminum	1.33E+04	6.16E-04	4.31E-02
Aroclor-1254	4.30E-03	1.98E-10	1.39E-08
Benzo(a)anthracene	1.11E-02	5.12E-10	3.58E-08
Benzo(a)pyrene	3.78E-01	1.74E-08	1.22E-06
Benzo(b)fluoranthene	2.52E-01	1.16E-08	8.14E-07
Dibenz(a,h)anthracene	1.08E-02	4.98E-10	3.49E-08
Indeno(1,2,3-cd)pyrene	3.96E-01	1.83E-08	1.28E-06
Iron	3.69E+04	1.70E-03	1.19E-01
Tetrachloroethene	2.11E-04	9.73E-12	6.81E-10

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
1,2-Dichloroethane	1.30E-01	1.27E-04	2.28E-12	1.60E-10
Aluminum	1.00E-02	1.33E+04	1.85E-05	1.29E-03
Aroclor-1254	1.30E-01	4.30E-03	7.74E-11	5.41E-09
Benzo(a)anthracene	1.30E-01	1.11E-02	2.00E-10	1.40E-08
Benzo(a)pyrene	1.30E-01	3.78E-01	6.80E-09	4.76E-07
Benzo(b)fluoranthene	1.30E-01	2.52E-01	4.53E-09	3.17E-07
Dibenz(a,h)anthracene	1.30E-01	1.08E-02	1.94E-10	1.36E-08
Indeno(1,2,3-cd)pyrene	1.30E-01	3.96E-01	7.12E-09	4.99E-07
Iron	1.00E-02	3.69E+04	5.11E-05	3.57E-03
Tetrachloroethene	1.30E-01	2.11E-04	3.80E-12	2.66E-10

INHALATION PATHWAY

Ac = Sc * (1/PEF + 1/VF)
EAC = (Ac * EF * ED) / AT *for carcinogens, a conversion is necessary to get into proper units, ug/m3

Chemical	Sc	VF	Ac	EAC for Carcinogens	EAC for Noncarcinogens
1,2-Dichloroethane	1.27E-04	1.41E+04	8.99E-09	8.80E-08	6.16E-09
Aluminum	1.22E+04		1.22E-05	1.19E-04	8.35E-06
Aroclor-1254	4.29E-03		4.29E-12	4.20E-11	2.94E-12
Benzo(a)anthracene	1.10E-02		1.10E-11	1.08E-10	7.53E-12
Benzo(a)pyrene	1.16E-02		1.16E-11	1.14E-10	7.95E-12
Benzo(b)fluoranthene	3.73E-01		3.73E-10	3.65E-09	2.55E-10
Dibenz(a,h)anthracene	1.10E-02		1.10E-11	1.08E-10	7.53E-12
Indeno(1,2,3-cd)pyrene	6.82E-01		6.82E-10	6.67E-09	4.67E-10
Iron	4.11E+04		4.11E-05	4.02E-04	2.82E-05
Tetrachloroethene	2.11E-04	1.51E+03	1.39E-07	1.36E-06	9.54E-08

TABLE C-16
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
AVERAGE -- INDUSTRIAL WORKER

SOIL INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see data page	
Ac	Air concentration (mg/m^3)	see below	
EAC	Effective air concentration (mg/m^3)	calculated	
VF	Volatilization Factor (m^3/kg)	calculated	EPA, 1996
PEF	Particulate Emission Factor (m^3/kg)	1.00E+09	EPA, 2004a
IR	Ingestion rate of soil (mg/day)	50	EPA, 2004a
SA	Skin surface area (cm2)	3300	EPA, 2004a
AF	Soil to skin adherence factor (mg/cm2)	0.021	EPA, 2001a
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	250	EPA, 2004a
ED	Exposure duration (yr)	25	EPA, 2004a
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	70	EPA, 1989
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	9125	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
1,2-Dichloroethane	1.95E-02	3.41E-09	9.54E-09
Aluminum	1.23E+04	2.14E-03	6.00E-03
Aroclor-1254	1.81E-01	3.16E-08	8.86E-08
Benzo(a)anthracene	1.09E-01	1.90E-08	5.33E-08
Benzo(a)pyrene	9.37E-02	1.64E-08	4.58E-08
Benzo(b)fluoranthene	1.44E-01	2.52E-08	7.05E-08
Dibenz(a,h)anthracene	6.88E-02	1.20E-08	3.37E-08
Indeno(1,2,3-cd)pyrene	1.15E-01	2.01E-08	5.63E-08
Iron	2.09E+04	3.65E-03	1.02E-02
Tetrachloroethene	1.26E-02	2.20E-09	6.16E-09

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
1,2-Dichloroethane	1.30E-01	1.95E-02	6.14E-10	1.72E-09
Aluminum	1.00E-02	1.23E+04	2.97E-05	8.32E-05
Aroclor-1254	1.30E-01	1.81E-01	5.70E-09	1.60E-08
Benzo(a)anthracene	1.30E-01	1.09E-01	3.43E-09	9.61E-09
Benzo(a)pyrene	1.30E-01	9.37E-02	2.95E-09	8.26E-09
Benzo(b)fluoranthene	1.30E-01	1.44E-01	4.53E-09	1.27E-08
Dibenz(a,h)anthracene	1.30E-01	6.88E-02	2.17E-09	6.06E-09
Indeno(1,2,3-cd)pyrene	1.30E-01	1.15E-01	3.62E-09	1.01E-08
Iron	1.00E-02	2.09E+04	5.06E-05	1.42E-04
Tetrachloroethene	1.30E-01	1.26E-02	3.97E-10	1.11E-09

INHALATION PATHWAY

Ac = Sc * (1/PEF + 1/VF)
EAC = (Ac * EF * ED) / AT *for carcinogens, a conversion is necessary to get into proper units, ug/m3

Chemical	Sc	VF	Ac	EAC for Carcinogens	EAC for Noncarcinogens
1,2-Dichloroethane	1.95E-02	1.41E+04	1.38E-06	3.38E-04	9.45E-07
Aluminum	1.07E+04		1.07E-05	2.61E-03	7.31E-06
Aroclor-1254	1.22E-02		1.22E-11	2.98E-09	8.36E-12
Benzo(a)anthracene	1.18E+00		1.18E-09	2.89E-07	8.08E-10
Benzo(a)pyrene	1.19E-01		1.19E-10	2.91E-08	8.15E-11
Benzo(b)fluoranthene	1.69E-01		1.69E-10	4.13E-08	1.16E-10
Dibenz(a,h)anthracene	7.69E-02		7.69E-11	1.88E-08	5.27E-11
Indeno(1,2,3-cd)pyrene	1.55E-01		1.55E-10	3.79E-08	1.06E-10
Iron	1.95E+04		1.95E-05	4.76E-03	1.33E-05
Tetrachloroethene	1.26E-02	1.51E+03	8.32E-06	2.03E-03	5.70E-06

TABLE C-17
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
RME -- INDUSTRIAL WORKER

SOIL INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see data page	
Ac	Air concentration (mg/m^3)	see below	
EAC	Effective air concentration (mg/m^3)	calculated	
VF	Volatilization Factor (m^3/kg)	calculated	EPA, 1996
PEF	Particulate Emission Factor (m^3/kg)	1.00E+09	EPA, 2004a
IR	Ingestion rate of soil (mg/day)	50	EPA, 2004a
SA	Skin surface area (cm2)	3300	EPA, 2004a
AF	Soil to skin adherence factor (mg/cm2)	0.2	EPA, 2004a
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	250	EPA, 2004a
ED	Exposure duration (yr)	25	EPA, 2004a
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	70	EPA, 1989
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	9125	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
1,2-Dichloroethane	1.27E-04	2.22E-11	6.21E-11
Aluminum	1.33E+04	2.33E-03	6.53E-03
Aroclor-1254	4.30E-03	7.51E-10	2.10E-09
Benzo(a)anthracene	1.11E-02	1.94E-09	5.43E-09
Benzo(a)pyrene	3.78E-01	6.60E-08	1.85E-07
Benzo(b)fluoranthene	2.52E-01	4.40E-08	1.23E-07
Dibenz(a,h)anthracene	1.08E-02	1.89E-09	5.28E-09
Indeno(1,2,3-cd)pyrene	3.96E-01	6.92E-08	1.94E-07
Iron	3.69E+04	6.45E-03	1.80E-02
Tetrachloroethene	2.11E-04	3.69E-11	1.03E-10

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
1,2-Dichloroethane	1.30E-01	1.27E-04	3.81E-11	1.07E-10
Aluminum	1.00E-02	1.33E+04	3.08E-04	8.62E-04
Aroclor-1254	1.30E-01	4.30E-03	1.29E-09	3.61E-09
Benzo(a)anthracene	1.30E-01	1.11E-02	3.33E-09	9.32E-09
Benzo(a)pyrene	1.30E-01	3.78E-01	1.13E-07	3.17E-07
Benzo(b)fluoranthene	1.30E-01	2.52E-01	7.56E-08	2.12E-07
Dibenz(a,h)anthracene	1.30E-01	1.08E-02	3.24E-09	9.07E-09
Indeno(1,2,3-cd)pyrene	1.30E-01	3.96E-01	1.19E-07	3.32E-07
Iron	1.00E-02	3.69E+04	8.51E-04	2.38E-03
Tetrachloroethene	1.30E-01	2.11E-04	6.33E-11	1.77E-10

INHALATION PATHWAY

Ac = Sc * (1/PEF + 1/VF)
EAC = (Ac * EF * ED) / AT *for carcinogens, a conversion is necessary to get into proper units, ug/m3

Chemical	Sc	VF	Ac	EAC for Carcinogens	EAC for Noncarcinogens
1,2-Dichloroethane	1.27E-04	1.41E+04	8.99E-09	2.20E-06	6.16E-09
Aluminum	1.22E+04		1.22E-05	2.98E-03	8.35E-06
Aroclor-1254	4.29E-03		4.29E-12	1.05E-09	2.94E-12
Benzo(a)anthracene	1.10E-02		1.10E-11	2.69E-09	7.53E-12
Benzo(a)pyrene	1.16E-02		1.16E-11	2.84E-09	7.95E-12
Benzo(b)fluoranthene	3.73E-01		3.73E-10	9.12E-08	2.55E-10
Dibenz(a,h)anthracene	1.10E-02		1.10E-11	2.69E-09	7.53E-12
Indeno(1,2,3-cd)pyrene	6.82E-01		6.82E-10	1.67E-07	4.67E-10
Iron	4.11E+04		4.11E-05	1.01E-02	2.82E-05
Tetrachloroethene	2.11E-04	1.51E+03	1.39E-07	3.41E-05	9.54E-08

APPENDIX C-3

INTAKE CALCULATIONS

SEDIMENT

TABLE C-18
EXPOSURE POINT CONCENTATION (mg/kg) FOR COPCs
SEDIMENT INTRACOASTAL WATERWAY

Parameter	Average		95% UCL	Statistic Used	
Benzo(a)pyrene	9.46E-02	<	1.58E-02	median	
Dibenz(a,h)anthracene	7.12E-02	<	1.57E-02	median	
Iron	1.34E+04		2.20E+04	97.5% Chebyshev	

TABLE C-19
INTAKE CALCULATIONS FOR SEDIMENT INTRACOASTAL WATERWAY
AVERAGE

SEDIMENT INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Sediment concentration (mg/kg)	see data page	
IR	Ingestion rate of soil (mg/day)	100	TRRP-24
SA	Skin surface area (cm2)	4400	TRRP-24
AF	Sediment to skin adherence factor (mg/cm2)	0.3	TRRP-24
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	19	professional judgment
ED	Exposure duration (yr)	13	professional judgment
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	70	EPA, 1989
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	9125	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
Benzo(a)pyrene	9.46E-02	1.31E-09	3.66E-09
Dibenz(a,h)anthracene	7.12E-02	9.83E-10	2.75E-09
Iron	1.34E+04	1.84E-04	5.16E-04

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
Benzo(a)pyrene	1.30E-01	9.46E-02	2.24E-09	6.28E-09
Dibenz(a,h)anthracene	1.30E-01	7.12E-02	1.69E-09	4.72E-09
Iron	1.00E-02	1.34E+04	2.43E-05	6.82E-05

TABLE C-20
INTAKE CALCULATIONS FOR SEDIMENT INTRACOASTAL WATERWAY
RME

SEDIMENT INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Sediment concentration (mg/kg)	see data page	
IR	Ingestion rate of soil (mg/day)	100	TRRP-24
SA	Skin surface area (cm2)	4400	TRRP-24
AF	Sediment to skin adherence factor (mg/cm2)	0.3	TRRP-24
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	39	TRRP-24
ED	Exposure duration (yr)	25	EPA, 1989
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	70	EPA, 1989
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	9125	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
Benzo(a)pyrene	1.58E-02	8.61E-10	2.41E-09
Dibenz(a,h)anthracene	1.57E-02	8.56E-10	2.40E-09
Iron	2.20E+04	1.20E-03	3.36E-03

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
Benzo(a)pyrene	1.30E-01	1.58E-02	1.48E-09	4.14E-09
Dibenz(a,h)anthracene	1.30E-01	1.57E-02	1.47E-09	4.11E-09
Iron	1.00E-02	2.20E+04	1.58E-04	4.43E-04

TABLE C-21
EXPOSURE POINT CONCENTATION (mg/kg) FOR COPCs
SEDIMENT NORTH OF MARLIN AVE.

Parameter	Average		95% UCL	Statistic Used
Aluminum	1.32E+04		1.40E+04	95% Student's-t
Benzo(a)pyrene	1.10E-01		3.47E-01	97.5% KM (Chebyshev)
Dibenz(a,h)anthracene	2.87E-01	<	3.75E-02	median
Indeno(1,2,3-cd)pyrene	2.20E-01		3.17E-01	95% KM (BCA)
Iron	1.72E+04		1.88E+04	95% Student's-t

TABLE C-22
INTAKE CALCULATIONS FOR SEDIMENT NORTH OF MARLIN AVE.
AVERAGE

SEDIMENT INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Sediment concentration (mg/kg)	see data page	
IR	Ingestion rate of soil (mg/day)	100	TRRP-24
SA	Skin surface area (cm2)	4400	TRRP-24
AF	Sediment to skin adherence factor (mg/cm2)	0.3	TRRP-24
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	19	professional judgment
ED	Exposure duration (yr)	13	professional judgment
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	70	EPA, 1989
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	9125	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
Aluminum	1.32E+04	1.83E-04	5.12E-04
Benzo(a)pyrene	1.10E-01	1.52E-09	4.25E-09
Dibenz(a,h)anthracene	2.87E-01	3.96E-09	1.11E-08
Indeno(1,2,3-cd)pyrene	2.20E-01	3.04E-09	8.51E-09
Iron	1.72E+04	2.37E-04	6.63E-04

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
Aluminum	0.00E+00	1.32E+04	0.00E+00	0.00E+00
Benzo(a)pyrene	1.30E-01	1.10E-01	2.61E-09	7.30E-09
Dibenz(a,h)anthracene	1.30E-01	2.87E-01	6.80E-09	1.90E-08
Indeno(1,2,3-cd)pyrene	0.00E+00	2.20E-01	0.00E+00	0.00E+00
Iron	1.00E-02	1.72E+04	3.13E-05	8.75E-05

TABLE C-23
INTAKE CALCULATIONS FOR SEDIMENT NORTH OF MARLIN AVE.
RME

SEDIMENT INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Sediment concentration (mg/kg)	see data page	
IR	Ingestion rate of soil (mg/day)	100	TRRP-24
SA	Skin surface area (cm2)	4400	TRRP-24
AF	Sediment to skin adherence factor (mg/cm2)	0.3	TRRP-24
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	39	TRRP-24
ED	Exposure duration (yr)	25	EPA, 1989
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	70	EPA, 1989
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	9125	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
Aluminum	1.40E+04	7.63E-04	2.14E-03
Benzo(a)pyrene	3.47E-01	1.89E-08	5.30E-08
Dibenz(a,h)anthracene	3.75E-02	2.04E-09	5.72E-09
Indeno(1,2,3-cd)pyrene	3.17E-01	1.73E-08	4.84E-08
Iron	1.88E+04	1.03E-03	2.87E-03

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
Aluminum	0.00E+00	1.40E+04	0.00E+00	0.00E+00
Benzo(a)pyrene	1.30E-01	3.47E-01	3.25E-08	9.09E-08
Dibenz(a,h)anthracene	1.30E-01	3.75E-02	3.51E-09	9.82E-09
Indeno(1,2,3-cd)pyrene	0.00E+00	3.17E-01	0.00E+00	0.00E+00
Iron	1.00E-02	1.88E+04	1.35E-04	3.79E-04

TABLE C-24
EXPOSURE POINT CONCENTATION (mg/kg) FOR COPCs
POND SEDIMENT

Parameter	Average		RME	Statistic Used
Aluminum	1.17E+04		1.40E+04	95% Student's t
Iron	1.53E+04		1.74E+04	95% Student's t
m,p-Cresol	3.75E-02	<	2.34E-02	median

TABLE C-25
INTAKE CALCULATIONS FOR POND SEDIMENT
AVERAGE

SEDIMENT INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Sediment concentration (mg/kg)	see data page	
IR	Ingestion rate of soil (mg/day)	100	TRRP-24
SA	Skin surface area (cm2)	4400	TRRP-24
AF	Sediment to skin adherence factor (mg/cm2)	0.3	TRRP-24
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	19	professional judgment
ED	Exposure duration (yr)	13	professional judgment
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	70	EPA, 1989
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	9125	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
Aluminum	1.17E+04	1.62E-04	4.54E-04
Iron	1.53E+04	2.11E-04	5.91E-04
m,p-Cresol	3.75E-02	5.18E-10	1.45E-09

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
Aluminum	1.00E-02	1.17E+04	2.14E-05	6.00E-05
Iron	1.00E-02	1.53E+04	2.78E-05	7.80E-05
m,p-Cresol	1.00E-01	3.75E-02	6.84E-10	1.91E-09

TABLE C-26
INTAKE CALCULATIONS FOR POND SEDIMENT
RME

SEDIMENT INGESTION

INTAKE = (Sc * IR * EF * ED * CF) / (BW * AT)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Sediment concentration (mg/kg)	see data page	
IR	Ingestion rate of soil (mg/day)	100	TRRP-24
SA	Skin surface area (cm2)	4400	TRRP-24
AF	Sediment to skin adherence factor (mg/cm2)	0.3	TRRP-24
ABSd	Dermal absorption fraction (unitless)	see chemprop page	
EF	Exposure frequency (day/yr)	39	TRRP-24
ED	Exposure duration (yr)	25	EPA, 1989
CF	Conversion factor (kg/mg)	1.00E-06	EPA, 1989
BW	Body weight (kg)	70	EPA, 1989
ATc	Averaging time for carcinogens (days)	25550	EPA, 1989
ATnc	Averaging time for noncarcinogens (days)	9125	EPA, 1989

Chemical	Sc	Intake for Carcinogens	Intake for Noncarcinogens
Aluminum	1.40E+04	7.63E-04	2.14E-03
Iron	1.74E+04	9.49E-04	2.66E-03
m,p-Cresol	2.34E-02	1.28E-09	3.57E-09

DERMAL CONTACT

INTAKE = (Sc * SA * AF * ABSd * EF * ED * CF) / (BW * AT)

Chemical	ABSd	Sc	Intake for Carcinogens	Intake for Noncarcinogens
Aluminum	1.00E-02	1.40E+04	1.01E-04	2.82E-04
Iron	1.00E-02	1.74E+04	1.25E-04	3.51E-04
m,p-Cresol	1.00E-01	2.34E-02	1.68E-09	4.71E-09

APPENDIX D

RISK CALCULATIONS

APPENDIX D-1

RISK CALCULATIONS

SOUTH OF MARLIN SOIL

TABLE D-1
CHEMICAL SPECIFIC TOXICITY VALUES*

Compound	EPA weight-of-evidence classification	CAS Number	Chronic RfD mg/kg-day	Notes:	Inhalaiton RfC mg/m3	Notes:	Oral Slope Factor 1/mg/kg-day	Notes:	Inhalation Unit Risk 1/ug/m3	Notes:	Dermal Absorption (unitless)	Notes:
4,4-DDD	B2	72-54-8	--		--		2.40E-01		--		1.30E-01	
Aluminum	Not available	7429-90-5	1.00E+00		5.00E-03		--		--		1.00E-02	
Aroclor-1254	B2	1336-36-3	2.00E-05		--		2.00E+00		5.70E-04		1.40E-01	
Arsenic	A	7440-38-2	3.00E-04		--		1.50E+00		4.30E-03		3.00E-02	
Benzo(a)anthracene	B2	56-55-3	--		--		7.30E-01		8.80E-05		1.30E-01	
Benzo(a)pyrene	B2	50-32-8	--		--		7.30E+00		8.80E-04		1.30E-01	
Benzo(b)fluoranthene	B2	205-99-2	--		--		7.30E-01		8.80E-05		1.30E-01	
Benzo(k)fluoranthene	B2	207-08-9	--		--		7.30E-02		8.80E-06		1.30E-01	
Dibenz(a,h)anthracene	B2	53-70-3	--		--		7.30E+00		8.80E-04		1.30E-01	
Dieldrin	B2	60-57-1	5.00E-05		--		1.60E+01		4.60E-03		1.30E-01	
Indeno(1,2,3-cd)pyrene	B2	193-39-5	--		--		7.30E-01		8.80E-05		1.30E-01	
Iron	Not available	7439-89-6	7.00E-01	NCEA, 2006	--		--		--		1.00E-02	
Isopropylbenzene (cumene)	D	98-82-8	1.00E-01		4.00E-01		--		--		1.30E-01	
Lead	B2	7439-92-1	--		--		--		--		1.00E-02	
Napthalene	D	91-20-3	2.00E-02		3.00E-03		--		--		1.30E-01	

Notes:
* Unless otherwise noted, the values were obtained from the EPA's on-line database, IRIS.

TABLE D-2
RISK/HAZARD CALCULATIONS FOR SOIL SOUTH OF MARLIN
AVERAGE -- YOUTH TRESPASSER

Cancer Risk = Intake*CSF or EAC * IUR

HQ = Intake / RfD or EAC / RfC

Parameter	Definition	Default
Intake	Intake of chemical (mg/kg-day)	see intake
EAC	Effective Air Concentration (mg/m^3)	see intake
CSF	Cancer slope factor (mg/kg-day)-1	see chemprop
IUR	Inhalation unit risk (ug/m^3)-1	see chemprop
RfD	Reference dose (mg/kg-day)	see chemprop
RfC	Inhalation reference concentration (mg/m^3)	see chemprop

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
4,4-DDD	2.40E-01	--	1.14E-10	3.19E-10	2.73E-11	
Aluminum	--	1.00E+00	9.47E-05	2.65E-04		2.65E-04
Aroclor-1254	2.00E+00	2.00E-05	3.17E-09	8.88E-09	6.34E-09	4.44E-04
Benzo(a)anthracene	7.30E-01	--	3.95E-09	1.11E-08	2.88E-09	
Benzo(a)pyrene	7.30E+00	--	5.11E-09	1.43E-08	3.73E-08	
Benzo(b)fluoranthene	7.30E-01	--	7.00E-09	1.96E-08	5.11E-09	
Benzo(k)fluoranthene	7.30E-02	--	2.32E-09	6.49E-09	1.69E-10	
Dibenz(a,h)anthracene	7.30E+00	--	2.17E-09	6.08E-09	1.59E-08	
Dieldrin	1.60E+01	5.00E-05	1.30E-11	3.65E-11	2.09E-10	7.31E-07
Indeno(1,2,3-cd)pyrene	7.30E-01	--	5.65E-09	1.58E-08	4.13E-09	
Iron	--	7.00E-01	2.10E-04	5.87E-04		8.38E-04
Isopropylbenzene (cumene)	--	1.00E-01	1.22E-08	3.42E-08		3.42E-07
Lead	--	--	7.86E-07	2.20E-06		
Napthalene	--	2.00E-02	4.78E-09	1.34E-08		6.70E-07
			PATHWAY TOTAL =		7.20E-08	1.55E-03

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
4,4-DDD	2.40E-01	--	5.18E-11	1.45E-10	1.24E-11	
Aluminum	--	1.00E+00	3.31E-06	9.28E-06		9.28E-06
Aroclor-1254	2.00E+00	2.00E-05	1.55E-09	4.35E-09	3.11E-09	2.17E-04
Benzo(a)anthracene	7.30E-01	--	1.80E-09	5.03E-09	1.31E-09	
Benzo(a)pyrene	7.30E+00	--	2.32E-09	6.51E-09	1.70E-08	
Benzo(b)fluoranthene	7.30E-01	--	3.19E-09	8.92E-09	2.33E-09	
Benzo(k)fluoranthene	7.30E-02	--	1.06E-09	2.95E-09	7.70E-11	
Dibenz(a,h)anthracene	7.30E+00	--	9.88E-10	2.77E-09	7.22E-09	
Dieldrin	1.60E+01	5.00E-05	5.94E-12	1.66E-11	9.50E-11	3.32E-07
Indeno(1,2,3-cd)pyrene	7.30E-01	--	2.57E-09	7.20E-09	1.88E-09	
Iron	--	7.00E-01	7.33E-06	2.05E-05		2.93E-05
Isopropylbenzene (cumene)	--	1.00E-01	5.55E-09	1.55E-08		1.55E-07
Lead	--	--	2.75E-08	7.70E-08		
Napthalene	--	2.00E-02	2.18E-09	6.10E-09		3.05E-07
			PATHWAY TOTAL =		3.30E-08	2.57E-04

INHALATION

Chemical	IUR	RfC	EAC Carc (ug/m3)	EAC Noncarc (mg/m3)	Cancer Risk	Hazard Quotient
4,4-DDD	--	--	1.80E-11	5.05E-14		
Aluminum	--	5.00E-03	3.13E-05	8.77E-08		1.75E-05
Aroclor-1254	5.70E-04	--	8.57E-10	2.40E-12	4.89E-13	
Benzo(a)anthracene	8.80E-05	--	2.10E-09	5.87E-12	1.84E-13	
Benzo(a)pyrene	8.80E-04	--	2.66E-09	7.45E-12	2.34E-12	
Benzo(b)fluoranthene	8.80E-05	--	3.45E-09	9.67E-12	3.04E-13	
Benzo(k)fluoranthene	8.80E-06		1.43E-09	4.01E-12	1.26E-14	
Dibenz(a,h)anthracene	8.80E-04	--	1.10E-09	3.07E-12	9.66E-13	
Dieldrin	4.60E-03		8.22E-12	2.30E-14	3.78E-14	
Indeno(1,2,3-cd)pyrene	8.80E-05	--	2.84E-09	7.94E-12	2.50E-13	
Iron	--	--	9.56E-05	2.68E-07		
Isopropylbenzene (cumene)	--	4.00E-01	1.32E-04	3.69E-07		9.22E-07
Lead	--	--	4.09E-07	1.14E-09		
Napthalene	--	3.00E-03	1.91E-09	5.36E-12		1.79E-09
			PATHWAY TOTAL =		4.58E-12	1.85E-05

TOTAL	**1.05E-07**	**1.82E-03**

TABLE D-3
RISK/HAZARD CALCULATIONS FOR SOIL SOUTH OF MARLIN
RME -- YOUTH TRESPASSER (age 6 to 18)

Cancer Risk =	Intake*CSF or EAC * IUR	HQ =	Intake / RfD or EAC / RfC

Parameter	Definition	Default
Intake	Intake of chemical (mg/kg-day)	see intake
EAC	Effective Air Concentration (mg/m^3)	see intake
CSF	Cancer slope factor (mg/kg-day)-1	see chemprop
IUR	Inhalation unit risk (ug/m^3)-1	see chemprop
RfD	Reference dose (mg/kg-day)	see chemprop
RfC	Inhalation reference concentration (mg/m^3)	see chemprop

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
4,4-DDD	2.40E-01	--	2.98E-09	8.35E-09	7.16E-10	
Aluminum	--	1.00E+00	4.81E-04	1.35E-03		1.35E-03
Aroclor-1254	2.00E+00	2.00E-05	4.54E-08	1.27E-07	9.08E-08	6.35E-03
Benzo(a)anthracene	7.30E-01	--	3.77E-08	1.06E-07	2.76E-08	
Benzo(a)pyrene	7.30E+00	--	4.48E-08	1.25E-07	3.27E-07	
Benzo(b)fluoranthene	7.30E-01	--	4.83E-08	1.35E-07	3.52E-08	
Benzo(k)fluoranthene	7.30E-02	--	2.24E-08	6.26E-08	1.63E-09	
Dibenz(a,h)anthracene	7.30E+00	--	1.06E-08	2.96E-08	7.71E-08	
Dieldrin	1.60E+01	5.00E-05	1.24E-10	3.47E-10	1.98E-09	6.94E-06
Indeno(1,2,3-cd)pyrene	7.30E-01	--	3.86E-08	1.08E-07	2.82E-08	
Iron	--	7.00E-01	1.02E-03	2.87E-03		4.10E-03
Isopropylbenzene (cumene)	--	1.00E-01	3.43E-07	9.61E-07		9.61E-06
Lead	--	--	6.11E-06	1.71E-05		
Napthalene	--	2.00E-02	1.56E-10	4.36E-10		2.18E-08
			PATHWAY TOTAL =		5.90E-07	1.18E-02

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
4,4-DDD	2.40E-01	--	1.36E-09	3.80E-09	3.26E-10	
Aluminum	--	1.00E+00	1.68E-05	4.72E-05		4.72E-05
Aroclor-1254	2.00E+00	2.00E-05	2.22E-08	6.23E-08	4.45E-08	3.11E-03
Benzo(a)anthracene	7.30E-01	--	1.72E-08	4.81E-08	1.25E-08	
Benzo(a)pyrene	7.30E+00	--	2.04E-08	5.71E-08	1.49E-07	
Benzo(b)fluoranthene	7.30E-01	--	2.20E-08	6.15E-08	1.60E-08	
Benzo(k)fluoranthene	7.30E-02	--	1.02E-08	2.85E-08	7.43E-10	
Dibenz(a,h)anthracene	7.30E+00	--	4.81E-09	1.35E-08	3.51E-08	
Dieldrin	1.60E+01	5.00E-05	5.64E-11	1.58E-10	9.02E-10	3.16E-06
Indeno(1,2,3-cd)pyrene	7.30E-01	--	1.76E-08	4.92E-08	1.28E-08	
Iron	--	7.00E-01	3.59E-05	1.00E-04		1.43E-04
Isopropylbenzene (cumene)	--	1.00E-01	1.56E-07	4.37E-07		4.37E-06
Lead	--	--	2.14E-07	5.98E-07		
Napthalene	--	2.00E-02	7.08E-11	1.98E-10		9.91E-09
			PATHWAY TOTAL =		2.72E-07	3.31E-03

INHALATION

Chemical	IUR	RfC	EAC Carc (ug/m3)	EAC Noncarc (mg/m3)	Cancer Risk	Hazard Quotient
4,4-DDD	--	--	6.34E-12	1.78E-14		
Aluminum	--	5.00E-03	1.40E-04	3.91E-07		7.82E-05
Aroclor-1254	5.70E-04	--	1.79E-08	5.02E-11	1.02E-11	
Benzo(a)anthracene	8.80E-05	--	2.12E-08	5.94E-11	1.87E-12	
Benzo(a)pyrene	8.80E-04	--	2.55E-08	7.13E-11	2.24E-11	
Benzo(b)fluoranthene	8.80E-05	--	2.59E-08	7.25E-11	2.28E-12	
Benzo(k)fluoranthene	8.80E-06	--	1.55E-08	4.33E-11	1.36E-13	
Dibenz(a,h)anthracene	8.80E-04	--	5.75E-09	1.61E-11	5.06E-12	
Dieldrin	4.60E-03	--	7.37E-11	2.06E-13	3.39E-13	
Indeno(1,2,3-cd)pyrene	8.80E-05	--	2.19E-08	6.12E-11	1.92E-12	
Iron	--	--	5.63E-04	1.58E-06		
Isopropylbenzene (cumene)	--	4.00E-01	3.71E-03	1.04E-05		2.59E-05
Lead	--		3.45E-06	9.66E-09		
Napthalene	--	3.00E-03	6.22E-11	1.74E-13		5.81E-11
			PATHWAY TOTAL =		4.43E-11	1.04E-04
				TOTAL	**8.62E-07**	**1.52E-02**

TABLE D-4
RISK/HAZARD CALCULATIONS FOR SOIL SOUTH OF MARLIN
AVERAGE -- CONSTRUCTION WORKER

Cancer Risk = Intake*CSF *or* EAC * IUR   HQ = Intake / RfD *or* EAC / RfC

Parameter	Definition	Default
Intake	Intake of chemical (mg/kg-day)	see intake
EAC	Effective Air Concentration (mg/m^3)	see intake
CSF	Cancer slope factor (mg/kg-day)-1	see chemprop
IUR	Inhalation unit risk (ug/m^3)-1	see chemprop
RfD	Reference dose (mg/kg-day)	see chemprop
RfC	Inhalation reference concentration (mg/m^3)	see chemprop

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
4,4-DDD	2.40E-01	–	6.44E-11	4.51E-09	1.55E-11	
Aluminum	–	1.00E+00	5.36E-05	3.75E-03		3.75E-03
Aroclor-1254	2.00E+00	2.00E-05	1.79E-09	1.26E-07	3.59E-09	6.28E-03
Benzo(a)anthracene	7.30E-01	–	2.23E-09	1.56E-07	1.63E-09	
Benzo(a)pyrene	7.30E+00	–	2.89E-09	2.02E-07	2.11E-08	
Benzo(b)fluoranthene	7.30E-01	–	3.96E-09	2.77E-07	2.89E-09	
Benzo(k)fluoranthene	7.30E-02	–	1.31E-09	9.18E-08	9.58E-11	
Dibenz(a,h)anthracene	7.30E+00	–	1.23E-09	8.60E-08	8.97E-09	
Dieldrin	1.60E+01	5.00E-05	7.38E-12	5.17E-10	1.18E-10	1.03E-05
Indeno(1,2,3-cd)pyrene	7.30E-01	–	3.20E-09	2.24E-07	2.33E-09	
Iron	–	7.00E-01	1.19E-04	8.30E-03		1.19E-02
Isopropylbenzene (cumene)	–	1.00E-01	6.90E-09	4.83E-07		4.83E-06
Lead	–	–	4.44E-07	3.11E-05		
Napthalene	–	2.00E-02	2.71E-09	1.89E-07		9.47E-06
			PATHWAY TOTAL =		4.07E-08	2.19E-02

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
4,4-DDD	2.40E-01	–	2.35E-11	1.64E-09	5.63E-12	
Aluminum	–	1.00E+00	1.50E-06	1.05E-04		1.05E-04
Aroclor-1254	2.00E+00	2.00E-05	7.03E-10	4.92E-08	1.41E-09	2.46E-03
Benzo(a)anthracene	7.30E-01	–	8.13E-10	5.69E-08	5.93E-10	
Benzo(a)pyrene	7.30E+00	–	1.05E-09	7.36E-08	7.68E-09	
Benzo(b)fluoranthene	7.30E-01	–	1.44E-09	1.01E-07	1.05E-09	
Benzo(k)fluoranthene	7.30E-02	–	4.78E-10	3.34E-08	3.49E-11	
Dibenz(a,h)anthracene	7.30E+00	–	4.47E-10	3.13E-08	3.27E-09	
Dieldrin	1.60E+01	5.00E-05	2.69E-12	1.88E-10	4.30E-11	3.76E-06
Indeno(1,2,3-cd)pyrene	7.30E-01	–	1.16E-09	8.15E-08	8.49E-10	
Iron	–	7.00E-01	3.32E-06	2.32E-04		3.32E-04
Isopropylbenzene (cumene)	–	1.00E-01	2.51E-09	1.76E-07		1.76E-06
Lead	–	–	1.24E-08	8.71E-07		
Napthalene	–	2.00E-02	9.85E-10	6.90E-08		3.45E-06
			PATHWAY TOTAL =		1.49E-08	2.91E-03

INHALATION

Chemical	IUR	RfC	EAC Carc (ug/m3)	EAC Noncarc (mg/m3)	Cancer Risk	Hazard Quotient
4,4-DDD	–	–	1.08E-11	7.57E-13		
Aluminum	–	5.00E-03	1.88E-05	1.32E-06		2.63E-04
Aroclor-1254	5.70E-04	–	5.14E-10	3.60E-11	2.93E-13	
Benzo(a)anthracene	8.80E-05	–	1.26E-09	8.80E-11	1.11E-13	
Benzo(a)pyrene	8.80E-04	–	1.60E-09	1.12E-10	1.40E-12	
Benzo(b)fluoranthene	8.80E-05	–	2.07E-09	1.45E-10	1.82E-13	
Benzo(k)fluoranthene	8.80E-06	–	8.59E-10	6.02E-11	7.56E-15	
Dibenz(a,h)anthracene	8.80E-04	–	6.59E-10	4.61E-11	5.80E-13	
Dieldrin	4.60E-03	–	4.93E-12	3.45E-13	2.27E-14	
Indeno(1,2,3-cd)pyrene	8.80E-05	–	1.70E-09	1.19E-10	1.50E-13	
Iron	–	–	5.74E-05	4.02E-06		
Isopropylbenzene (cumene)	–	4.00E-01	7.90E-05	5.53E-06		1.38E-05
Lead	–		2.45E-07	1.72E-08		
Napthalene	–	3.00E-03	1.15E-09	8.04E-11		2.68E-08
			PATHWAY TOTAL =		2.75E-12	2.77E-04

TOTAL	**5.57E-08**	**2.51E-02**

TABLE D-5
RISK/HAZARD CALCULATIONS FOR SOIL SOUTH OF MARLIN
RME -- CONSTRUCTION WORKER

Cancer Risk = Intake*CSF *or* EAC * IUR

HQ = Intake / RfD *or* EAC / RfC

Parameter	Definition	Default
Intake	Intake of chemical (mg/kg-day)	see intake
EAC	Effective Air Concentration (mg/m^3)	see intake
CSF	Cancer slope factor (mg/kg-day)-1	see chemprop
IUR	Inhalation unit risk (ug/m^3)-1	see chemprop
RfD	Reference dose (mg/kg-day)	see chemprop
RfC	Inhalation reference concentration (mg/m^3)	see chemprop

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
4,4-DDD	2.40E-01	--	2.34E-09	1.64E-07	5.62E-10	
Aluminum	--	1.00E+00	3.78E-04	2.65E-02		2.65E-02
Aroclor-1254	2.00E+00	2.00E-05	3.57E-08	2.50E-06	7.13E-08	1.25E-01
Benzo(a)anthracene	7.30E-01	--	2.97E-08	2.08E-06	2.17E-08	
Benzo(a)pyrene	7.30E+00	--	3.52E-08	2.46E-06	2.57E-07	
Benzo(b)fluoranthene	7.30E-01	--	3.79E-08	2.65E-06	2.77E-08	
Benzo(k)fluoranthene	7.30E-02	--	1.76E-08	1.23E-06	1.28E-09	
Dibenz(a,h)anthracene	7.30E+00	--	8.30E-09	5.81E-07	6.06E-08	
Dieldrin	1.60E+01	5.00E-05	9.73E-11	6.81E-09	1.56E-09	1.36E-04
Indeno(1,2,3-cd)pyrene	7.30E-01	--	3.04E-08	2.12E-06	2.22E-08	
Iron	--	7.00E-01	8.05E-04	5.64E-02		8.05E-02
Isopropylbenzene (cumene)	--	1.00E-01	2.70E-07	1.89E-05		1.89E-04
Lead	--	--	4.80E-06	3.36E-04		
Napthalene	--	2.00E-02	1.22E-10	8.56E-09		4.28E-07
			PATHWAY TOTAL =		4.64E-07	2.32E-01

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
4,4-DDD	2.40E-01	--	9.14E-10	6.40E-08	2.19E-10	
Aluminum	--	1.00E+00	1.13E-05	7.94E-04		7.94E-04
Aroclor-1254	2.00E+00	2.00E-05	1.50E-08	1.05E-06	3.00E-08	5.24E-02
Benzo(a)anthracene	7.30E-01	--	1.16E-08	8.10E-07	8.44E-09	
Benzo(a)pyrene	7.30E+00	--	1.37E-08	9.61E-07	1.00E-07	
Benzo(b)fluoranthene	7.30E-01	--	1.48E-08	1.04E-06	1.08E-08	
Benzo(k)fluoranthene	7.30E-02	--	6.85E-09	4.80E-07	5.00E-10	
Dibenz(a,h)anthracene	7.30E+00	--	3.24E-09	2.27E-07	2.36E-08	
Dieldrin	1.60E+01	5.00E-05	3.80E-11	2.66E-09	6.07E-10	5.31E-05
Indeno(1,2,3-cd)pyrene	7.30E-01	--	1.18E-08	8.29E-07	8.64E-09	
Iron	--	7.00E-01	2.42E-05	1.69E-03		2.42E-03
Isopropylbenzene (cumene)	--	1.00E-01	1.05E-07	7.36E-06		7.36E-05
Lead	--	--	1.44E-07	1.01E-05		
Napthalene	--	2.00E-02	4.77E-11	3.34E-09		1.67E-07
			PATHWAY TOTAL =		1.83E-07	5.58E-02

INHALATION

Chemical	IUR	RfC	EAC Carc (ug/m3)	EAC Noncarc (mg/m3)	Cancer Risk	Hazard Quotient
4,4-DDD	--	--	2.64E-12	1.85E-13		
Aluminum	--	5.00E-03	5.82E-05	4.07E-06		8.15E-04
Aroclor-1254	5.70E-04	--	7.48E-09	5.23E-10	4.26E-12	
Benzo(a)anthracene	8.80E-05	--	8.84E-09	6.18E-10	7.78E-13	
Benzo(a)pyrene	8.80E-04	--	1.06E-08	7.43E-10	9.34E-12	
Benzo(b)fluoranthene	8.80E-05	--	1.08E-08	7.55E-10	9.49E-13	
Benzo(k)fluoranthene	8.80E-06	--	6.44E-09	4.51E-10	5.67E-14	
Dibenz(a,h)anthracene	8.80E-04	--	2.40E-09	1.68E-10	2.11E-12	
Dieldrin	4.60E-03	--	3.07E-11	2.15E-12	1.41E-13	
Indeno(1,2,3-cd)pyrene	8.80E-05	--	9.11E-09	6.38E-10	8.02E-13	
Iron	--	--	2.34E-04	1.64E-05		
Isopropylbenzene (cumene)	--	4.00E-01	1.54E-03	1.08E-04		2.70E-04
Lead	--		1.44E-06	1.01E-07		
Napthalene	--	3.00E-03	2.59E-11	1.82E-12		6.05E-10
			PATHWAY TOTAL =		1.84E-11	2.70E-04

TOTAL	**6.47E-07**	**2.88E-01**

TABLE D-6
RISK/HAZARD CALCULATIONS FOR SOIL SOUTH OF MARLIN
AVERAGE -- INDUSTRIAL WORKER

Cancer Risk =	Intake*CSF *or* EAC * IUR	HQ =	Intake / RfD *or* EAC / RfC

Parameter	Definition	Default
Intake	Intake of chemical (mg/kg-day)	see intake
EAC	Effective Air Concentration (mg/m^3)	see intake
CSF	Cancer slope factor (mg/kg-day)-1	see chemprop
IUR	Inhalation unit risk (ug/m^3)-1	see chemprop
RfD	Reference dose (mg/kg-day)	see chemprop
RfC	Inhalation reference concentration (mg/m^3)	see chemprop

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
4,4-DDD	2.40E-01	--	1.36E-09	3.80E-09	3.25E-10	
Aluminum	--	1.00E+00	1.13E-03	3.16E-03		3.16E-03
Aroclor-1254	2.00E+00	2.00E-05	3.77E-08	1.06E-07	7.55E-08	5.28E-03
Benzo(a)anthracene	7.30E-01	--	4.70E-08	1.32E-07	3.43E-08	
Benzo(a)pyrene	7.30E+00	--	6.08E-08	1.70E-07	4.44E-07	
Benzo(b)fluoranthene	7.30E-01	--	8.33E-08	2.33E-07	6.08E-08	
Benzo(k)fluoranthene	7.30E-02	--	2.76E-08	7.73E-08	2.02E-09	
Dibenz(a,h)anthracene	7.30E+00	--	2.59E-08	7.24E-08	1.89E-07	
Dieldrin	1.60E+01	5.00E-05	1.55E-10	4.35E-10	2.49E-09	8.70E-06
Indeno(1,2,3-cd)pyrene	7.30E-01	--	6.73E-08	1.88E-07	4.91E-08	
Iron	--	7.00E-01	2.49E-03	6.98E-03		9.98E-03
Isopropylbenzene (cumene)	--	1.00E-01	1.45E-07	4.07E-07		4.07E-06
Lead	--	--	9.35E-06	2.62E-05		
Napthalene	--	2.00E-02	5.70E-08	1.59E-07		7.97E-06
			PATHWAY TOTAL =		8.57E-07	1.84E-02

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
4,4-DDD	2.40E-01	--	2.44E-10	6.84E-10	5.86E-11	
Aluminum	--	1.00E+00	1.56E-05	4.37E-05		4.37E-05
Aroclor-1254	2.00E+00	2.00E-05	7.32E-09	2.05E-08	1.46E-08	1.03E-03
Benzo(a)anthracene	7.30E-01	--	8.47E-09	2.37E-08	6.18E-09	
Benzo(a)pyrene	7.30E+00	--	1.10E-08	3.07E-08	8.00E-08	
Benzo(b)fluoranthene	7.30E-01	--	1.50E-08	4.20E-08	1.10E-08	
Benzo(k)fluoranthene	7.30E-02	--	4.97E-09	1.39E-08	3.63E-10	
Dibenz(a,h)anthracene	7.30E+00	--	4.66E-09	1.30E-08	3.40E-08	
Dieldrin	1.60E+01	5.00E-05	2.80E-11	7.84E-11	4.48E-10	1.57E-06
Indeno(1,2,3-cd)pyrene	7.30E-01	--	1.21E-08	3.39E-08	8.85E-09	
Iron	--	7.00E-01	3.46E-05	9.68E-05		1.38E-04
Isopropylbenzene (cumene)	--	1.00E-01	2.62E-08	7.33E-08		7.33E-07
Lead	--	--	1.30E-07	3.63E-07		
Napthalene	--	2.00E-02	1.03E-08	2.87E-08		1.44E-06
			PATHWAY TOTAL =		1.56E-07	1.21E-03

INHALATION

Chemical	IUR	RfC	EAC Carc (ug/m3)	EAC Noncarc (mg/m3)	Cancer Risk	Hazard Quotient
4,4-DDD	--	--	7.51E-10	2.10E-12		
Aluminum	--	5.00E-03	1.31E-03	3.65E-06		7.31E-04
Aroclor-1254	5.70E-04	--	3.57E-08	1.00E-10	2.04E-11	
Benzo(a)anthracene	8.80E-05	--	8.73E-08	2.45E-10	7.68E-12	
Benzo(a)pyrene	8.80E-04	--	1.11E-07	3.10E-10	9.75E-11	
Benzo(b)fluoranthene	8.80E-05	--	1.44E-07	4.03E-10	1.27E-11	
Benzo(k)fluoranthene	8.80E-06	--	5.97E-08	1.67E-10	5.25E-13	
Dibenz(a,h)anthracene	8.80E-04	--	4.57E-08	1.28E-10	4.03E-11	
Dieldrin	4.60E-03	--	3.42E-10	9.59E-13	1.58E-12	
Indeno(1,2,3-cd)pyrene	8.80E-05	--	1.18E-07	3.31E-10	1.04E-11	
Iron	--	--	3.98E-03	1.12E-05		
Isopropylbenzene (cumene)	--	4.00E-01	5.49E-03	1.54E-05		3.84E-05
Lead	--		1.70E-05	4.77E-08		
Napthalene	--	3.00E-03	7.97E-08	2.23E-10		7.44E-08
			PATHWAY TOTAL =		1.91E-10	7.69E-04

TOTAL	**1.01E-06**	**2.04E-02**

TABLE D-7
RISK/HAZARD CALCULATIONS FOR SOIL SOUTH OF MARLIN
RME -- INDUSTRIAL WORKER

Cancer Risk = Intake*CSF *or* EAC * IUR   HQ = Intake / RfD *or* EAC / RfC

Parameter	Definition	Default
Intake	Intake of chemical (mg/kg-day)	see intake
EAC	Effective Air Concentration (mg/m^3)	see intake
CSF	Cancer slope factor (mg/kg-day)-1	see chemprop
IUR	Inhalation unit risk (ug/m^3)-1	see chemprop
RfD	Reference dose (mg/kg-day)	see chemprop
RfC	Inhalation reference concentration (mg/m^3)	see chemprop

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
4,4-DDD	2.40E-01	--	8.88E-09	2.49E-08	2.13E-09	
Aluminum	--	1.00E+00	1.43E-03	4.01E-03		4.01E-03
Aroclor-1254	2.00E+00	2.00E-05	1.35E-07	3.78E-07	2.70E-07	1.89E-02
Benzo(a)anthracene	7.30E-01	--	1.12E-07	3.15E-07	8.20E-08	
Benzo(a)pyrene	7.30E+00	--	1.33E-07	3.73E-07	9.73E-07	
Benzo(b)fluoranthene	7.30E-01	--	1.44E-07	4.02E-07	1.05E-07	
Benzo(k)fluoranthene	7.30E-02	--	6.66E-08	1.86E-07	4.86E-09	
Dibenz(a,h)anthracene	7.30E+00	--	3.15E-08	8.81E-08	2.30E-07	
Dieldrin	1.60E+01	5.00E-05	3.69E-10	1.03E-09	5.90E-09	2.06E-05
Indeno(1,2,3-cd)pyrene	7.30E-01	--	1.15E-07	3.22E-07	8.39E-08	
Iron	--	7.00E-01	3.05E-03	8.54E-03		1.22E-02
Isopropylbenzene (cumene)	--	1.00E-01	1.02E-06	2.86E-06		2.86E-05
Lead	--	--	1.82E-05	5.09E-05		
Napthalene	--	2.00E-02	4.63E-10	1.30E-09		6.48E-08
			PATHWAY TOTAL =		1.76E-06	3.52E-02

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
4,4-DDD	2.40E-01	--	1.52E-08	4.26E-08	3.66E-09	
Aluminum	--	1.00E+00	1.89E-04	5.29E-04		5.29E-04
Aroclor-1254	2.00E+00	2.00E-05	2.50E-07	6.99E-07	4.99E-07	3.49E-02
Benzo(a)anthracene	7.30E-01	--	1.93E-07	5.40E-07	1.41E-07	
Benzo(a)pyrene	7.30E+00	--	2.29E-07	6.41E-07	1.67E-06	
Benzo(b)fluoranthene	7.30E-01	--	2.46E-07	6.90E-07	1.80E-07	
Benzo(k)fluoranthene	7.30E-02	--	1.14E-07	3.20E-07	8.34E-09	
Dibenz(a,h)anthracene	7.30E+00	--	5.40E-08	1.51E-07	3.94E-07	
Dieldrin	1.60E+01	5.00E-05	6.33E-10	1.77E-09	1.01E-08	3.54E-05
Indeno(1,2,3-cd)pyrene	7.30E-01	--	1.97E-07	5.52E-07	1.44E-07	
Iron	--	7.00E-01	4.03E-04	1.13E-03		1.61E-03
Isopropylbenzene (cumene)	--	1.00E-01	1.75E-06	4.91E-06		4.91E-05
Lead	--	--	2.40E-06	6.72E-06		
Napthalene	--	2.00E-02	7.95E-10	2.22E-09		1.11E-07
			PATHWAY TOTAL =		3.05E-06	3.72E-02

INHALATION

Chemical	IUR	RfC	EAC Carc (ug/m3)	EAC Noncarc (mg/m3)	Cancer Risk	Hazard Quotient
4,4-DDD	--	--	6.60E-11	1.85E-13		
Aluminum	--	5.00E-03	1.45E-03	4.07E-06		8.15E-04
Aroclor-1254	5.70E-04	--	1.87E-07	5.23E-10	1.07E-10	
Benzo(a)anthracene	8.80E-05	--	2.21E-07	6.18E-10	1.94E-11	
Benzo(a)pyrene	8.80E-04	--	2.65E-07	7.43E-10	2.34E-10	
Benzo(b)fluoranthene	8.80E-05	--	2.70E-07	7.55E-10	2.37E-11	
Benzo(k)fluoranthene	8.80E-06	--	1.61E-07	4.51E-10	1.42E-12	
Dibenz(a,h)anthracene	8.80E-04	--	5.99E-08	1.68E-10	5.27E-11	
Dieldrin	4.60E-03	--	7.68E-10	2.15E-12	3.53E-12	
Indeno(1,2,3-cd)pyrene	8.80E-05	--	2.28E-07	6.38E-10	2.00E-11	
Iron	--	--	5.86E-03	1.64E-05		
Isopropylbenzene (cumene)	--	4.00E-01	3.86E-02	1.08E-04		2.70E-04
Lead	--		3.59E-05	1.01E-07		
Napthalene	--	3.00E-03	6.48E-10	1.82E-12		6.05E-10
			PATHWAY TOTAL =		4.61E-10	1.08E-03
				TOTAL	**4.81E-06**	**7.34E-02**

APPENDIX D-2

RISK CALCULATIONS

NORTH OF MARLIN SOIL

TABLE D-8
CHEMICAL SPECIFIC TOXICITY VALUES*

Compound	EPA weight-of-evidence classification	CAS Number	Chronic RfD mg/kg-day	Notes:	Inhalaiton RfC mg/m3	Notes:	Oral Slope Factor 1/mg/kg-day	Notes:	Inhalation Unit Risk 1/ug/m3	Notes:	Dermal Absorption (unitless)	Notes:
1,2-Dichloroethane	B2	107-06-2	2.00E-02		2.40E+00		9.10E-02		2.60E-05		1.30E-01	
Aluminum	Not available	7429-90-5	1.00E-01		5.00E-03		--		--		1.00E-02	
Aroclor-1254	B2	1336-36-3	2.00E-05		--		2.00E+00		5.70E-04		1.30E-01	
Benzo(a)anthracene	B2	56-55-3	--		--		7.30E-01		8.80E-05		1.30E-01	
Benzo(a)pyrene	B2	50-32-8	--		--		7.30E+00		8.80E-04		1.30E-01	
Benzo(b)fluoranthene	B2	205-99-2	--		--		7.30E-01		8.80E-05		1.30E-01	
Dibenz(a,h)anthracene	B2	53-70-3	--		--		7.30E+00		8.80E-04		1.30E-01	
Indeno(1,2,3-cd)pyrene	B2	193-39-5	--		--		7.30E-01		8.80E-05		1.30E-01	
Iron	Not available	7439-89-6	7.00E-01	NCEA, 2006	--		--		--		1.00E-02	
Tetrachloroethene	B2	127-18-4	1.00E-02		2.70E-01		5.20E-02		5.80E-07		1.30E-01	

Notes:
* Unless otherwise noted, the values were obtained from EPA's on-line database, IRIS.

TABLE D-9
RISK/HAZARD CALCULATIONS FOR SOIL NORTH OF MARLIN
AVERAGE -- YOUTH TRESPASSER

Cancer Risk = Intake*CSF *or* EAC * IUR

HQ = Intake / RfD *or* EAC / RfC

Parameter	Definition	Default
Intake	Intake of chemical (mg/kg-day)	see intake
EAC	Effective Air Concentration (mg/m^3)	see intake
CSF	Cancer slope factor (mg/kg-day)-1	see chemprop
IUR	Inhalation unit risk (ug/m^3)-1	see chemprop
RfD	Reference dose (mg/kg-day)	see chemprop
RfC	Inhalation reference concentration (mg/m^3)	see chemprop

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	9.10E-02	2.00E-02	2.86E-10	8.01E-10	2.60E-11	4.01E-08
Aluminum	--	1.00E-01	1.80E-04	5.04E-04		5.04E-03
Aroclor-1254	2.00E+00	2.00E-05	2.66E-09	7.44E-09	5.31E-09	3.72E-04
Benzo(a)anthracene	7.30E-01	--	1.60E-09	4.48E-09	1.17E-09	
Benzo(a)pyrene	7.30E+00	--	1.38E-09	3.85E-09	1.00E-08	
Benzo(b)fluoranthene	7.30E-01	--	2.11E-09	5.92E-09	1.54E-09	
Dibenz(a,h)anthracene	7.30E+00	--	1.01E-09	2.83E-09	7.37E-09	
Indeno(1,2,3-cd)pyrene	7.30E-01	--	1.69E-09	4.73E-09	1.23E-09	
Iron	--	7.00E-01	3.07E-04	8.58E-04		1.23E-03
Tetrachloroethene	5.20E-02	1.00E-02	1.85E-10	5.18E-10	9.62E-12	5.18E-08
			PATHWAY TOTAL =		2.67E-08	6.64E-03

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	9.10E-02	2.00E-02	1.30E-10	3.65E-10	1.19E-11	1.82E-08
Aluminum	--	1.00E-01	6.30E-06	1.76E-05		1.76E-04
Aroclor-1254	2.00E+00	2.00E-05	1.21E-09	3.38E-09	2.42E-09	1.69E-04
Benzo(a)anthracene	7.30E-01	--	7.28E-10	2.04E-09	5.31E-10	
Benzo(a)pyrene	7.30E+00	--	6.26E-10	1.75E-09	4.57E-09	
Benzo(b)fluoranthene	7.30E-01	--	9.62E-10	2.69E-09	7.02E-10	
Dibenz(a,h)anthracene	7.30E+00	--	4.59E-10	1.29E-09	3.35E-09	
Indeno(1,2,3-cd)pyrene	7.30E-01	--	7.68E-10	2.15E-09	5.61E-10	
Iron	--	7.00E-01	1.07E-05	3.00E-05		4.29E-05
Tetrachloroethene	5.20E-02	1.00E-02	8.41E-11	2.36E-10	4.38E-12	2.36E-08
			PATHWAY TOTAL =		1.21E-08	3.89E-04

INHALATION

Chemical	IUR	RfC	EAC Carc (ug/m3)	EAC Noncarc (mg/m3)	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	2.60E-05	2.40E+00	8.10E-06	2.27E-08		
Aluminum	--	5.00E-03	6.27E-05	1.75E-07		3.51E-05
Aroclor-1254	5.70E-04	--	7.16E-11	2.01E-13	4.08E-14	
Benzo(a)anthracene	8.80E-05	--	6.93E-09	1.94E-11	6.10E-13	
Benzo(a)pyrene	8.80E-04	--	6.99E-10	1.96E-12	6.15E-13	
Benzo(b)fluoranthene	8.80E-05	--	9.92E-10	2.78E-12	8.73E-14	
Dibenz(a,h)anthracene	8.80E-04	--	4.51E-10	1.26E-12	3.97E-13	
Indeno(1,2,3-cd)pyrene	8.80E-05	--	9.10E-10	2.55E-12	8.01E-14	
Iron	--	--	1.14E-04	3.20E-07		
Tetrachloroethene	5.80E-07	2.70E-01	4.88E-05	1.37E-07	2.83E-11	5.06E-07
			PATHWAY TOTAL =		3.02E-11	3.56E-05

TOTAL	**3.89E-08**	**7.06E-03**

TABLE D-10
RISK/HAZARD CALCULATIONS FOR SOIL NORTH OF MARLIN
RME -- YOUTH TRESPASSER (age 6 to 18)

Cancer Risk =	Intake*CSF *or* EAC * IUR	HQ =	Intake / RfD *or* EAC / RfC

Parameter	Definition	Default
Intake	Intake of chemical (mg/kg-day)	see intake
EAC	Effective Air Concentration (mg/m^3)	see intake
CSF	Cancer slope factor (mg/kg-day)-1	see chemprop
IUR	Inhalation unit risk (ug/m^3)-1	see chemprop
RfD	Reference dose (mg/kg-day)	see chemprop
RfC	Inhalation reference concentration (mg/m^3)	see chemprop

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	9.10E-02	2.00E-02	7.46E-12	2.09E-11	6.78E-13	1.04E-09
Aluminum	--	1.00E-01	7.83E-04	2.19E-03		2.19E-02
Aroclor-1254	2.00E+00	2.00E-05	2.52E-10	7.07E-10	5.05E-10	3.53E-05
Benzo(a)anthracene	7.30E-01	--	6.52E-10	1.82E-09	4.76E-10	
Benzo(a)pyrene	7.30E+00	--	2.22E-08	6.21E-08	1.62E-07	
Benzo(b)fluoranthene	7.30E-01	--	1.48E-08	4.14E-08	1.08E-08	
Dibenz(a,h)anthracene	7.30E+00	--	6.34E-10	1.78E-09	4.63E-09	
Indeno(1,2,3-cd)pyrene	7.30E-01	--	2.32E-08	6.51E-08	1.70E-08	
Iron	--	7.00E-01	2.17E-03	6.06E-03		8.66E-03
Tetrachloroethene	5.20E-02	1.00E-02	1.24E-11	3.47E-11	6.44E-13	3.47E-09
			PATHWAY TOTAL =		1.95E-07	3.06E-02

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	9.10E-02	2.00E-02	3.39E-12	9.50E-12	3.09E-13	4.75E-10
Aluminum	--	1.00E-01	2.74E-05	7.68E-05		7.68E-04
Aroclor-1254	2.00E+00	2.00E-05	1.15E-10	3.22E-10	2.30E-10	1.61E-05
Benzo(a)anthracene	7.30E-01	--	2.97E-10	8.30E-10	2.16E-10	
Benzo(a)pyrene	7.30E+00	--	1.01E-08	2.83E-08	7.37E-08	
Benzo(b)fluoranthene	7.30E-01	--	6.73E-09	1.88E-08	4.91E-09	
Dibenz(a,h)anthracene	7.30E+00	--	2.88E-10	8.08E-10	2.11E-09	
Indeno(1,2,3-cd)pyrene	7.30E-01	--	1.06E-08	2.96E-08	7.72E-09	
Iron	--	7.00E-01	7.58E-05	2.12E-04		3.03E-04
Tetrachloroethene	5.20E-02	1.00E-02	5.64E-12	1.58E-11	2.93E-13	1.58E-09
			PATHWAY TOTAL =		8.89E-08	1.09E-03

INHALATION

Chemical	IUR	RfC	EAC Carc (ug/m3)	EAC Noncarc (mg/m3)	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	2.60E-05	2.40E+00	2.11E-07	5.91E-10	5.49E-12	2.46E-10
Aluminum	--	5.00E-03	2.86E-04	8.01E-07		1.60E-04
Aroclor-1254	5.70E-04	--	1.01E-10	2.82E-13	5.74E-14	
Benzo(a)anthracene	8.80E-05	--	2.58E-10	7.23E-13	2.27E-14	
Benzo(a)pyrene	8.80E-04	--	2.72E-10	7.63E-13	2.40E-13	
Benzo(b)fluoranthene	8.80E-05	--	8.76E-09	2.45E-11	7.71E-13	
Dibenz(a,h)anthracene	8.80E-04	--	2.58E-10	7.23E-13	2.27E-13	
Indeno(1,2,3-cd)pyrene	8.80E-05	--	1.60E-08	4.48E-11	1.41E-12	
Iron	--	--	9.66E-04	2.70E-06		
Tetrachloroethene	5.80E-07	2.70E-01	3.27E-06	9.16E-09	1.90E-12	3.39E-08
			PATHWAY TOTAL =		1.01E-11	1.60E-04

				TOTAL	**2.84E-07**	**3.19E-02**

TABLE D-11
RISK/HAZARD CALCULATIONS FOR SOIL NORTH OF MARLIN
AVERAGE -- CONSTRUCTION WORKER

Cancer Risk = Intake*CSF *or* EAC * IUR

HQ = Intake / RfD *or* EAC / RfC

Parameter	Definition	Default
Intake	Intake of chemical (mg/kg-day)	see intake
EAC	Effective Air Concentration (mg/m^3)	see intake
CSF	Cancer slope factor (mg/kg-day)-1	see chemprop
IUR	Inhalation unit risk (ug/m^3)-1	see chemprop
RfD	Reference dose (mg/kg-day)	see chemprop
RfC	Inhalation reference concentration (mg/m^3)	see chemprop

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	9.10E-02	2.00E-02	1.62E-10	1.13E-08	1.47E-11	5.67E-07
Aluminum	--	1.00E-01	1.02E-04	7.13E-03		7.13E-02
Aroclor-1254	2.00E+00	2.00E-05	1.50E-09	1.05E-07	3.01E-09	5.26E-03
Benzo(a)anthracene	7.30E-01	--	9.05E-10	6.34E-08	6.61E-10	
Benzo(a)pyrene	7.30E+00	--	7.78E-10	5.45E-08	5.68E-09	
Benzo(b)fluoranthene	7.30E-01	--	1.20E-09	8.37E-08	8.73E-10	
Dibenz(a,h)anthracene	7.30E+00	--	5.71E-10	4.00E-08	4.17E-09	
Indeno(1,2,3-cd)pyrene	7.30E-01	--	9.55E-10	6.68E-08	6.97E-10	
Iron	--	7.00E-01	1.73E-04	1.21E-02		1.73E-02
Tetrachloroethene	5.20E-02	1.00E-02	1.05E-10	7.32E-09	5.44E-12	7.32E-07
			PATHWAY TOTAL =		1.51E-08	9.39E-02

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	9.10E-02	2.00E-02	5.89E-11	4.13E-09	5.36E-12	2.06E-07
Aluminum	--	1.00E-01	2.85E-06	2.00E-04		2.00E-03
Aroclor-1254	2.00E+00	2.00E-05	5.47E-10	3.83E-08	1.09E-09	1.91E-03
Benzo(a)anthracene	7.30E-01	--	3.29E-10	2.31E-08	2.40E-10	
Benzo(a)pyrene	7.30E+00	--	2.83E-10	1.98E-08	2.07E-09	
Benzo(b)fluoranthene	7.30E-01	--	4.35E-10	3.05E-08	3.18E-10	
Dibenz(a,h)anthracene	7.30E+00	--	2.08E-10	1.46E-08	1.52E-09	
Indeno(1,2,3-cd)pyrene	7.30E-01	--	3.48E-10	2.43E-08	2.54E-10	
Iron	--	7.00E-01	4.86E-06	3.40E-04		4.86E-04
Tetrachloroethene	5.20E-02	1.00E-02	3.81E-11	2.67E-09	1.98E-12	2.67E-07
			PATHWAY TOTAL =		5.50E-09	4.40E-03

INHALATION

Chemical	IUR	RfC	EAC Carc (ug/m3)	EAC Noncarc (mg/m3)	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	2.60E-05	2.40E+00	4.86E-06	3.40E-07	1.26E-10	1.42E-07
Aluminum	--	5.00E-03	3.76E-05	2.63E-06		5.26E-04
Aroclor-1254	5.70E-04	--	4.30E-11	3.01E-12	2.45E-14	
Benzo(a)anthracene	8.80E-05	--	4.16E-09	2.91E-10	3.66E-13	
Benzo(a)pyrene	8.80E-04	--	4.19E-10	2.93E-11	3.69E-13	
Benzo(b)fluoranthene	8.80E-05	--	5.95E-10	4.17E-11	5.24E-14	
Dibenz(a,h)anthracene	8.80E-04	--	2.71E-10	1.90E-11	2.38E-13	
Indeno(1,2,3-cd)pyrene	8.80E-05	--	5.46E-10	3.82E-11	4.80E-14	
Iron	--	--	6.86E-05	4.80E-06		
Tetrachloroethene	5.80E-07	2.70E-01	2.93E-05	2.05E-06	1.70E-11	7.60E-06
			PATHWAY TOTAL =		1.44E-10	5.34E-04

TOTAL	**2.07E-08**	**9.88E-02**

TABLE D-12
RISK/HAZARD CALCULATIONS FOR SOIL NORTH OF MARLIN
RME -- CONSTRUCTION WORKER

Cancer Risk =	Intake*CSF	HQ =	Intake / RfD
	or		*or*
	EAC * IUR		EAC / RfC

Parameter	Definition	Default
Intake	Intake of chemical (mg/kg-day)	see intake
EAC	Effective Air Concentration (mg/m^3)	see intake
CSF	Cancer slope factor (mg/kg-day)-1	see chemprop
IUR	Inhalation unit risk (ug/m^3)-1	see chemprop
RfD	Reference dose (mg/kg-day)	see chemprop
RfC	Inhalation reference concentration (mg/m^3)	see chemprop

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	9.10E-02	2.00E-02	5.86E-12	4.10E-10	5.33E-13	2.05E-08
Aluminum	--	1.00E-01	6.16E-04	4.31E-02		4.31E-01
Aroclor-1254	2.00E+00	2.00E-05	1.98E-10	1.39E-08	3.97E-10	6.94E-04
Benzo(a)anthracene	7.30E-01	--	5.12E-10	3.58E-08	3.74E-10	
Benzo(a)pyrene	7.30E+00	--	1.74E-08	1.22E-06	1.27E-07	
Benzo(b)fluoranthene	7.30E-01	--	1.16E-08	8.14E-07	8.49E-09	
Dibenz(a,h)anthracene	7.30E+00	--	4.98E-10	3.49E-08	3.64E-09	
Indeno(1,2,3-cd)pyrene	7.30E-01	--	1.83E-08	1.28E-06	1.33E-08	
Iron	--	7.00E-01	1.70E-03	1.19E-01		1.70E-01
Tetrachloroethene	5.20E-02	1.00E-02	9.73E-12	6.81E-10	5.06E-13	6.81E-08
			PATHWAY TOTAL =		1.54E-07	6.02E-01

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	9.10E-02	2.00E-02	2.28E-12	1.60E-10	2.08E-13	8.00E-09
Aluminum	--	1.00E-01	1.85E-05	1.29E-03		1.29E-02
Aroclor-1254	2.00E+00	2.00E-05	7.74E-11	5.41E-09	1.55E-10	2.71E-04
Benzo(a)anthracene	7.30E-01	--	2.00E-10	1.40E-08	1.46E-10	
Benzo(a)pyrene	7.30E+00	--	6.80E-09	4.76E-07	4.96E-08	
Benzo(b)fluoranthene	7.30E-01	--	4.53E-09	3.17E-07	3.31E-09	
Dibenz(a,h)anthracene	7.30E+00	--	1.94E-10	1.36E-08	1.42E-09	
Indeno(1,2,3-cd)pyrene	7.30E-01	--	7.12E-09	4.99E-07	5.20E-09	
Iron	--	7.00E-01	5.11E-05	3.57E-03		5.11E-03
Tetrachloroethene	5.20E-02	1.00E-02	3.80E-12	2.66E-10	1.97E-13	2.66E-08
			PATHWAY TOTAL =		5.99E-08	1.83E-02

INHALATION

Chemical	IUR	RfC	EAC Carc (ug/m3)	EAC Noncarc (mg/m3)	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	2.60E-05	2.40E+00	8.80E-08	6.16E-09	2.29E-12	2.57E-09
Aluminum	--	5.00E-03	1.19E-04	8.35E-06		1.67E-03
Aroclor-1254	5.70E-04	--	4.20E-11	2.94E-12	2.39E-14	
Benzo(a)anthracene	8.80E-05	--	1.08E-10	7.53E-12	9.47E-15	
Benzo(a)pyrene	8.80E-04	--	1.14E-10	7.95E-12	9.99E-14	
Benzo(b)fluoranthene	8.80E-05	--	3.65E-09	2.55E-10	3.21E-13	
Dibenz(a,h)anthracene	8.80E-04	--	1.08E-10	7.53E-12	9.47E-14	
Indeno(1,2,3-cd)pyrene	8.80E-05	--	6.67E-09	4.67E-10	5.87E-13	
Iron	--	--	4.02E-04	2.82E-05		
Tetrachloroethene	5.80E-07	2.70E-01	1.36E-06	9.54E-08	7.91E-13	3.53E-07
			PATHWAY TOTAL =		4.21E-12	1.67E-03

TOTAL	**2.13E-07**	**6.22E-01**

TABLE D-13
RISK/HAZARD CALCULATIONS FOR SOIL NORTH OF MARLIN
AVERAGE -- INDUSTRIAL WORKER

Cancer Risk =	Intake*CSF *or* EAC * IUR	HQ =	Intake / RfD *or* EAC / RfC

Parameter	Definition	Default
Intake	Intake of chemical (mg/kg-day)	see intake
EAC	Effective Air Concentration (mg/m^3)	see intake
CSF	Cancer slope factor (mg/kg-day)-1	see chemprop
IUR	Inhalation unit risk (ug/m^3)-1	see chemprop
RfD	Reference dose (mg/kg-day)	see chemprop
RfC	Inhalation reference concentration (mg/m^3)	see chemprop

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	9.10E-02	2.00E-02	3.41E-09	9.54E-09	3.10E-10	4.77E-07
Aluminum	--	1.00E-01	2.14E-03	6.00E-03		6.00E-02
Aroclor-1254	2.00E+00	2.00E-05	3.16E-08	8.86E-08	6.33E-08	4.43E-03
Benzo(a)anthracene	7.30E-01	--	1.90E-08	5.33E-08	1.39E-08	
Benzo(a)pyrene	7.30E+00	--	1.64E-08	4.58E-08	1.20E-07	
Benzo(b)fluoranthene	7.30E-01	--	2.52E-08	7.05E-08	1.84E-08	
Dibenz(a,h)anthracene	7.30E+00	--	1.20E-08	3.37E-08	8.78E-08	
Indeno(1,2,3-cd)pyrene	7.30E-01	--	2.01E-08	5.63E-08	1.47E-08	
Iron	--	7.00E-01	3.65E-03	1.02E-02		1.46E-02
Tetrachloroethene	5.20E-02	1.00E-02	2.20E-09	6.16E-09	1.14E-10	6.16E-07
			PATHWAY TOTAL =		3.18E-07	7.90E-02

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	9.10E-02	2.00E-02	6.14E-10	1.72E-09	5.59E-11	8.59E-08
Aluminum	--	1.00E-01	2.97E-05	8.32E-05		8.32E-04
Aroclor-1254	2.00E+00	2.00E-05	5.70E-09	1.60E-08	1.14E-08	7.98E-04
Benzo(a)anthracene	7.30E-01	--	3.43E-09	9.61E-09	2.51E-09	
Benzo(a)pyrene	7.30E+00	--	2.95E-09	8.26E-09	2.15E-08	
Benzo(b)fluoranthene	7.30E-01	--	4.53E-09	1.27E-08	3.31E-09	
Dibenz(a,h)anthracene	7.30E+00	--	2.17E-09	6.06E-09	1.58E-08	
Indeno(1,2,3-cd)pyrene	7.30E-01	--	3.62E-09	1.01E-08	2.64E-09	
Iron	--	7.00E-01	5.06E-05	1.42E-04		2.02E-04
Tetrachloroethene	5.20E-02	1.00E-02	3.97E-10	1.11E-09	2.06E-11	1.11E-07
			PATHWAY TOTAL =		5.73E-08	1.83E-03

INHALATION

Chemical	IUR	RfC	EAC Carc (ug/m3)	EAC Noncarc (mg/m3)	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	2.60E-05	2.40E+00	3.38E-04	9.45E-07	8.78E-09	3.94E-07
Aluminum	--	5.00E-03	2.61E-03	7.31E-06		1.46E-03
Aroclor-1254	5.70E-04	--	2.98E-09	8.36E-12	1.70E-12	
Benzo(a)anthracene	8.80E-05	--	2.89E-07	8.08E-10	2.54E-11	
Benzo(a)pyrene	8.80E-04	--	2.91E-08	8.15E-11	2.56E-11	
Benzo(b)fluoranthene	8.80E-05	--	4.13E-08	1.16E-10	3.64E-12	
Dibenz(a,h)anthracene	8.80E-04	--	1.88E-08	5.27E-11	1.66E-11	
Indeno(1,2,3-cd)pyrene	8.80E-05	--	3.79E-08	1.06E-10	3.34E-12	
Iron	--	--	4.76E-03	1.33E-05		
Tetrachloroethene	5.80E-07	2.70E-01	2.03E-03	5.70E-06	1.18E-09	2.11E-05
			PATHWAY TOTAL =		1.00E-08	1.48E-03

TOTAL	**3.85E-07**	**8.24E-02**

TABLE D-14
RISK/HAZARD CALCULATIONS FOR SOIL NORTH OF MARLIN
RME -- INDUSTRIAL WORKER

Cancer Risk =	Intake*CSF *or* EAC * IUR	HQ =	Intake / RfD *or* EAC / RfC

Parameter	Definition	Default
Intake	Intake of chemical (mg/kg-day)	see intake
EAC	Effective Air Concentration (mg/m^3)	see intake
CSF	Cancer slope factor (mg/kg-day)-1	see chemprop
IUR	Inhalation unit risk (ug/m^3)-1	see chemprop
RfD	Reference dose (mg/kg-day)	see chemprop
RfC	Inhalation reference concentration (mg/m^3)	see chemprop

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	9.10E-02	2.00E-02	2.22E-11	6.21E-11	2.02E-12	3.11E-09
Aluminum	--	1.00E-01	2.33E-03	6.53E-03		6.53E-02
Aroclor-1254	2.00E+00	2.00E-05	7.51E-10	2.10E-09	1.50E-09	1.05E-04
Benzo(a)anthracene	7.30E-01	--	1.94E-09	5.43E-09	1.42E-09	
Benzo(a)pyrene	7.30E+00	--	6.60E-08	1.85E-07	4.82E-07	
Benzo(b)fluoranthene	7.30E-01	--	4.40E-08	1.23E-07	3.21E-08	
Dibenz(a,h)anthracene	7.30E+00	--	1.89E-09	5.28E-09	1.38E-08	
Indeno(1,2,3-cd)pyrene	7.30E-01	--	6.92E-08	1.94E-07	5.05E-08	
Iron	--	7.00E-01	6.45E-03	1.80E-02		2.58E-02
Tetrachloroethene	5.20E-02	1.00E-02	3.69E-11	1.03E-10	1.92E-12	1.03E-08
			PATHWAY TOTAL =		5.81E-07	9.12E-02

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	9.10E-02	2.00E-02	3.81E-11	1.07E-10	3.47E-12	5.33E-09
Aluminum	--	1.00E-01	3.08E-04	8.62E-04		8.62E-03
Aroclor-1254	2.00E+00	2.00E-05	1.29E-09	3.61E-09	2.58E-09	1.80E-04
Benzo(a)anthracene	7.30E-01	--	3.33E-09	9.32E-09	2.43E-09	
Benzo(a)pyrene	7.30E+00	--	1.13E-07	3.17E-07	8.27E-07	
Benzo(b)fluoranthene	7.30E-01	--	7.56E-08	2.12E-07	5.52E-08	
Dibenz(a,h)anthracene	7.30E+00	--	3.24E-09	9.07E-09	2.36E-08	
Indeno(1,2,3-cd)pyrene	7.30E-01	--	1.19E-07	3.32E-07	8.67E-08	
Iron	--	7.00E-01	8.51E-04	2.38E-03		3.40E-03
Tetrachloroethene	5.20E-02	1.00E-02	6.33E-11	1.77E-10	3.29E-12	1.77E-08
			PATHWAY TOTAL =		9.98E-07	1.22E-02

INHALATION

Chemical	IUR	RfC	EAC Carc (ug/m3)	EAC Noncarc (mg/m3)	Cancer Risk	Hazard Quotient
1,2-Dichloroethane	2.60E-05	2.40E+00	2.20E-06	6.16E-09	5.72E-11	2.57E-09
Aluminum	--	5.00E-03	2.98E-03	8.35E-06		1.67E-03
Aroclor-1254	5.70E-04	--	1.05E-09	2.94E-12	5.98E-13	
Benzo(a)anthracene	8.80E-05	--	2.69E-09	7.53E-12	2.37E-13	
Benzo(a)pyrene	8.80E-04	--	2.84E-09	7.95E-12	2.50E-12	
Benzo(b)fluoranthene	8.80E-05	--	9.12E-08	2.55E-10	8.03E-12	
Dibenz(a,h)anthracene	8.80E-04	--	2.69E-09	7.53E-12	2.37E-12	
Indeno(1,2,3-cd)pyrene	8.80E-05	--	1.67E-07	4.67E-10	1.47E-11	
Iron	--	--	1.01E-02	2.82E-05		
Tetrachloroethene	5.80E-07	2.70E-01	3.41E-05	9.54E-08	1.98E-11	3.53E-07
			PATHWAY TOTAL =		1.05E-10	1.67E-03
				TOTAL	**1.58E-06**	**1.05E-01**

APPENDIX D-3

RISK CALCULATIONS

SEDIMENT

TABLE D-15
CHEMICAL SPECIFIC TOXICITY VALUES*

Compound	EPA weight-of-evidence classification	CAS Number	Chronic RfD mg/kg-day	Notes:	Inhalaiton RfC mg/m3	Notes:	Oral Slope Factor 1/mg/kg-day	Notes:	Inhalation Unit Risk 1/ug/m3	Notes:	Dermal Absorption (unitless)	Notes:
Benzo(a)pyrene	B2	50-32-8	--		--		7.30E+00		8.80E-04		1.30E-01	
Dibenz(a,h)anthracene	B2	53-70-3	--		--		7.30E+00		8.80E-04		1.30E-01	
Iron	Not available	7439-89-6	7.00E-01	NCEA, 2006	--		--		--		1.00E-02	

Notes:
* Unless otherwise noted, the values were obtained from the TCEQ's June 26, 2007 Toxicity Factors and other tables.

TABLE D-16
RISK/HAZARD CALCULATIONS FOR SEDIMENT INTRACOASTAL WATERWAY
AVERAGE

Cancer Risk =	Intake*CSF	HQ =	Intake / RfD

Parameter	Definition	Default
Intake	Intake of chemical (mg/kg-day)	see intake
CSF	Cancer slope factor (mg/kg-day)-1	see chemprop
RfD	Reference dose (mg/kg-day)	see chemprop

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
Benzo(a)pyrene	7.30E+00	--	1.31E-09	3.66E-09	9.54E-09	
Dibenz(a,h)anthracene	7.30E+00	--	9.83E-10	2.75E-09	7.18E-09	
Iron	--	7.00E-01	1.84E-04	5.16E-04		7.38E-04
			PATHWAY TOTAL =		1.67E-08	7.38E-04

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
Benzo(a)pyrene	7.30E+00	--	2.24E-09	6.28E-09	1.64E-08	
Dibenz(a,h)anthracene	7.30E+00	--	1.69E-09	4.72E-09	1.23E-08	
Iron	--	7.00E-01	2.43E-05	6.82E-05		9.74E-05
			PATHWAY TOTAL =		2.87E-08	9.74E-05
				TOTAL	**4.54E-08**	**8.35E-04**

TABLE D-17
RISK/HAZARD CALCULATIONS FOR SEDIMENT INTRACOASTAL WATERWAY
RME

Cancer Risk =	Intake*CSF	HQ =	Intake / RfD				
Parameter	Definition					Default	
Intake	Intake of chemical (mg/kg-day)					see intake	
CSF	Cancer slope factor (mg/kg-day)-1					see chemprop	
RfD	Reference dose (mg/kg-day)					see chemprop	

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
Benzo(a)pyrene	7.30E+00	--	8.61E-10	2.41E-09	6.29E-09	
Dibenz(a,h)anthracene	7.30E+00	--	8.56E-10	2.40E-09	6.25E-09	
Iron	--	7.00E-01	1.20E-03	3.36E-03		4.80E-03
			PATHWAY TOTAL =		1.25E-08	4.80E-03

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
Benzo(a)pyrene	7.30E+00	--	1.48E-09	4.14E-09	1.08E-08	
Dibenz(a,h)anthracene	7.30E+00	--	1.47E-09	4.11E-09	1.07E-08	
Iron	--	7.00E-01	1.58E-04	4.43E-04		6.34E-04
			PATHWAY TOTAL =		2.15E-08	6.34E-04
				TOTAL	**3.40E-08**	**5.43E-03**

TABLE D-18
CHEMICAL SPECIFIC TOXICITY VALUES*

Compound	EPA weight-of-evidence classification	CAS Number	Chronic RfD mg/kg-day	Notes:	Inhalaiton RfC mg/m3	Notes:	Oral Slope Factor 1/mg/kg-day	Notes:	Inhalation Unit Risk 1/ug/m3	Notes:	Dermal Absorption (unitless)	Notes:
Aluminum												
Benzo(a)pyrene	B2	50-32-8	--		--		7.30E+00		8.80E-04		1.30E-01	
Dibenz(a,h)anthracene	B2	53-70-3	--		--		7.30E+00		8.80E-04		1.30E-01	
Indeno(1,2,3-cd)pyrene												
Iron	Not available	7439-89-6	7.00E-01	NCEA, 2006	--		--		--		1.00E-02	

Notes:
* Unless otherwise noted, the values were obtained from the TCEQ's June 26, 2007 Toxicity Factors and other tables.

TABLE D-19
RISK/HAZARD CALCULATIONS FOR SEDIMENT NORTH OF MARLIN AVE.
AVERAGE

Cancer Risk =	Intake*CSF	HQ =	Intake / RfD

Parameter	Definition	Default
Intake	Intake of chemical (mg/kg-day)	see intake
CSF	Cancer slope factor (mg/kg-day)-1	see chemprop
RfD	Reference dose (mg/kg-day)	see chemprop

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
Aluminum	0.00E+00	0.00E+00	1.83E-04	5.12E-04	0.00E+00	
Benzo(a)pyrene	7.30E+00	--	1.52E-09	4.25E-09	1.11E-08	
Dibenz(a,h)anthracene	7.30E+00	--	3.96E-09	1.11E-08	2.89E-08	
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	3.04E-09	8.51E-09	0.00E+00	
Iron	--	7.00E-01	2.37E-04	6.63E-04		9.47E-04
			PATHWAY TOTAL =		4.00E-08	9.47E-04

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
Aluminum	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)pyrene	7.30E+00	--	2.61E-09	7.30E-09	1.90E-08	
Dibenz(a,h)anthracene	7.30E+00	--	6.80E-09	1.90E-08	4.97E-08	
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Iron	--	7.00E-01	3.13E-05	8.75E-05		1.25E-04
			PATHWAY TOTAL =		6.87E-08	1.25E-04
				TOTAL	**1.09E-07**	**1.07E-03**

TABLE D-20
RISK/HAZARD CALCULATIONS FOR SEDIMENT NORTH OF MARLIN AVE.
RME

Cancer Risk =	Intake*CSF	HQ =	Intake / RfD

Parameter	Definition	Default
Intake	Intake of chemical (mg/kg-day)	see intake
CSF	Cancer slope factor (mg/kg-day)-1	see chemprop
RfD	Reference dose (mg/kg-day)	see chemprop

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
Aluminum	0.00E+00	0.00E+00	7.63E-04	2.14E-03	0.00E+00	
Benzo(a)pyrene	7.30E+00	--	1.89E-08	5.30E-08	1.38E-07	
Dibenz(a,h)anthracene	7.30E+00	--	2.04E-09	5.72E-09	1.49E-08	
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	1.73E-08	4.84E-08	0.00E+00	
Iron	--	7.00E-01	1.03E-03	2.87E-03		4.10E-03
			PATHWAY TOTAL =		1.53E-07	4.10E-03

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
Aluminum	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)pyrene	7.30E+00	--	3.25E-08	9.09E-08	2.37E-07	
Dibenz(a,h)anthracene	7.30E+00	--	3.51E-09	9.82E-09	2.56E-08	
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Iron	--	7.00E-01	1.35E-04	3.79E-04		5.42E-04
			PATHWAY TOTAL =		2.63E-07	5.42E-04

TOTAL	**4.16E-07**	**4.65E-03**

TABLE D-21
CHEMICAL SPECIFIC TOXICITY VALUES*

Compound	EPA weight-of-evidence classification	CAS Number	Chronic RfD mg/kg-day	Notes:	Inhalaiton RfC mg/m3	Notes:	Oral Slope Factor 1/mg/kg-day	Notes:	Inhalation Unit Risk 1/ug/m3	Notes:	Dermal Absorption (unitless)	Notes:
Aluminum	Not available	7429-90-5	1.00E-01		5.00E-03		--		--		1.00E-02	
Iron	Not available	7439-89-6	7.00E-01	NCEA, 2006	--		--		--		1.00E-02	
m,p-Cresol	C	1319-77-3	5.00E-02		1.00E-02		--		--		1.00E-01	

Notes:
* Unless otherwise noted, the values were obtained from the TCEQ's June 26, 2007 Toxicity Factors and other tables.

TABLE D-22
RISK/HAZARD CALCULATIONS FOR POND SEDIMENT
AVERAGE

Cancer Risk =	Intake*CSF	HQ =	Intake / RfD					
Parameter	Definition					Default		
Intake	Intake of chemical (mg/kg-day)					see intake		
CSF	Cancer slope factor (mg/kg-day)-1					see chemprop		
RfD	Reference dose (mg/kg-day)					see chemprop		

INGESTION Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
Aluminum	--	1.00E-01	1.62E-04	4.54E-04		4.54E-03
Iron	--	7.00E-01	2.11E-04	5.91E-04		8.44E-04
m,p-Cresol	--	5.00E-02	5.18E-10	1.45E-09		2.90E-08
			PATHWAY TOTAL =		0.00E+00	5.39E-03

DERMAL CONTACT Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
Aluminum	--	1.00E-01	2.14E-05	6.00E-05		6.00E-04
Iron	--	7.00E-01	2.78E-05	7.80E-05		1.11E-04
m,p-Cresol	--	5.00E-02	6.84E-10	1.91E-09		3.83E-08
			PATHWAY TOTAL =		0.00E+00	7.11E-04
				TOTAL	**0.00E+00**	**6.10E-03**

TABLE D-23
RISK/HAZARD CALCULATIONS FOR POND SEDIMENT
RME

Cancer Risk = Intake*CSF HQ = Intake / RfD

Parameter	Definition	Default
Intake	Intake of chemical (mg/kg-day)	see intake
CSF	Cancer slope factor (mg/kg-day)-1	see chemprop
RfD	Reference dose (mg/kg-day)	see chemprop

INGESTION

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
Aluminum	--	1.00E-01	7.63E-04	2.14E-03		2.14E-02
Iron	--	7.00E-01	9.49E-04	2.66E-03		3.79E-03
m,p-Cresol	--	5.00E-02	1.28E-09	3.57E-09		7.14E-08
			PATHWAY TOTAL =		0.00E+00	2.52E-02

DERMAL CONTACT

Chemical	Slope Factor	RfD	Intake Carc	Intake Noncarc	Cancer Risk	Hazard Quotient
Aluminum	--	1.00E-01	1.01E-04	2.82E-04		2.82E-03
Iron	--	7.00E-01	1.25E-04	3.51E-04		5.01E-04
m,p-Cresol	--	5.00E-02	1.68E-09	4.71E-09		9.43E-08
			PATHWAY TOTAL =		0.00E+00	3.32E-03
				TOTAL	**0.00E+00**	**2.85E-02**

APPENDIX E

RESTRICTIVE COVENANTS

RESTRICTIVE COVENANT FOR LIMITATION ON USES, CONSTRUCTION AND GROUNDWATER USE

Doc# 2009036113

STATE OF TEXAS §
§
COUNTY OF BRAZORIA §

10N

This Restrictive Covenant is filed to provide information concerning certain use limitations upon that parcel of real property (the "Property") described in Exhibits A and B, attached hereto and incorporated herein by reference, and which at the time of this filing is listed on the United States Environmental Protection Agency's ("EPA") National Priority List as a "Superfund Site."

As of the date of this Restrictive Covenant, the record owner of fee title to the Property is **LDL COASTAL LIMITED, L.P.**, a Texas limited partnership ("Owner"), with an address of c/o Allen Daniels, 6363 Woodway Drive, Suite 730, Houston, Texas 77057. The appropriate land use for the Property is commercial/industrial.

Owner has agreed to place the following restrictions on the Property in favor of The Dow Chemical Company ("Dow"), Chromalloy American Corporation ("Chromalloy"), the Texas Commission on Environmental Quality ("TCEQ"), the State of Texas and EPA.

NOW THEREFORE, in consideration of the premises and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the following restrictive covenants in favor of Dow, Chromalloy, TCEQ, the State of Texas and EPA are placed on the Property, to-wit:

1. Commercial/Industrial Use.

The Property shall not be used for any purposes other than commercial/industrial uses, as that term is defined under 30 T.A.C §350.4(a)(13), and thus shall not be used for human habitation or for other purposes with a similar potential for human exposure. Portions of the soils and/or groundwater of the Property contain certain identified chemicals of concern. Future users of the Property are advised to review and take into consideration environmental data from publicly available sources (i.e. TCEQ and EPA) prior to utilizing the Property for any purpose.

2. Groundwater.

The groundwater underlying the Property shall not be used for any beneficial purpose, including: (1) drinking water or other potable uses; (2) the irrigation or watering of landscapes or (3) agricultural uses. For any activities that may result in potential exposure to the groundwater, a plan must be in place to address and ensure the appropriate handling, treatment and disposal of any affected soils or groundwater.

3. Construction.

Construction of any building on the Property is not advisable. If any person desires in the future to construct a building at the Property, the EPA and TCEQ must be notified and must approve of such construction in writing, as additional response actions, such as protection against indoor vapor intrusion, may be necessary before the Property may be built upon. The costs for any additional response actions will be borne by the party(s) desiring to construct upon the Property.

4. These restrictions shall be a covenant running with the land.

For additional information, contact:

The Dow Chemical Company
2030 Dow Center
8th Floor Legal Dept.
Midland, MI 48674
ATTN: General Counsel

Chromalloy American Corporation
C/O Sequa Corporation
200 Park Avenue
New York, NY 10166
ATTN: General Counsel

U.S. Environmental Protection Agency, Region 6
Superfund Division (6RC-S)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733
ATTN: Assistant Regional Counsel

Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087
ATTN: Remediation Division

State of Texas
Office of the Texas Attorney General
Natural Resources Division
300 W. 15th Street
Austin, TX 78701

The restrictions imposed by this Restrictive Covenant may be rendered of no further force or effect only by a release executed by Dow, Chromalloy, TCEQ, the State of Texas and EPA or their successors and filed in the same Real Property Records as those in which this Restrictive Covenant is filed.

Executed this 28th day of July, 2009.

OWNER: **LDL COASTAL LIMITED, L.P., a Texas limited partnership**

By: **RAMWAY Management, L.L.C., a Texas limited liability company, its sole general partner**

By: [signature]

Name: Allen B. Daniels

Title: Manager

STATE OF TEXAS §

COUNTY OF Harris §

§

BEFORE ME, on this the 28 day of July, 2009, personally appeared Allen B. Daniels, Manager, of RAMWAY Management, L.L.C., a Texas limited liability company and the sole general partner of LDL Coastal Limited, L.P., a Texas limited partnership, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and in the capacity herein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 28 day of July, 2009.

NOTARY PUBLIC STATE OF TEXAS
Meredith Anne Moran
My Commission Expires
12/13/2011

Meredith Anne Moran

Notary Public in and for the State of Texas

My Commission Expires: 12/13/2011

2662312.1/SP/73364/0238/052909

Exhibit A

Legal Description of the Property

Doyle & Wachtstetter, Inc
Surveying and Mapping • GPS/GIS

PARCEL No. 1, 5.0010 ACRE ENVIRONMENTAL MANAGEMENT TRACT
LOT 55 OF THE BRAZOS COAST INVESTMENT COMPANY SUBDIVISION, DIVISION 8
FREDERICK. J. CALVIT LEAGUE, ABSTRACT 51
BRAZORIA COUNTY, TEXAS

ALL THAT CERTAIN 5.0010 ACRE tract of land lying in and situated in the Frederick J. Calvit League, Abstract 51, Brazoria County, Texas, being all of Lot 55 of the Brazos Coast Investment Company Subdivision, Division 8 (B.C.I.C. Div. 8), according to the map or plat thereof recorded in Volume 2, Page 141 of the Brazoria County Plat Records (B.C.P.R.) and being the same tract of land conveyed by deed on August 6, 1999 from Janet Casciato-Northrup, Trustee of the Chapter 7 Bankruptcy Estate of Hercules Marine Services Corporation to LDL Coastal Limited, L.P., as recorded in Clerk's File No. 99-036339 of the Brazoria County Official Records (B.C.O.R.), the herein described tract of land being more particularly described by metes and bounds, using survey terminology which refers to the Texas State Plane Coordinate System, South Central Zone (NAD83), in which the directions are Lambert grid bearings and the distances are surface level horizontal lengths (S.F.= 0.99988752832) as follows

COMMENCING at a 3/4" iron rod found marking the North corner Lot 80, same being the West corner of Lot 81 of the aforementioned B.C.I.C. Div. 8 subdivision, located in the southeastern right-of-way boundary line of a 40 foot wide platted roadway of the said B.C.I.C. Div. 8 subdivision, said Point of Commencement being at Texas at State Plane Coordinate System position X=3155152.81 and Y=13556863.07, from which an old 3" x 3/4" hard-wood stake located in the southeastern right-of-way boundary line of a 40 foot wide platted roadway of the said B.C.I.C. Div. 8 subdivision, found marking the North corner of Lot 66, same being the and the West corner of Lot 67 bears South 42°51'47" West, a distance of 4620.94 feet (called 4620.00 feet), at Texas State Plane Coordinate System position X=3152009.76 and Y=13553476.39, herein located point of commencement and point of reference, being shown in 1952 Dow Chemical Company survey by Herman D. Smith, RPS #916, drawing number: B8-8-19000-10488;

THENCE South 42°51'47" West, coincident with the southeastern right-of-way boundary line of said 40 foot wide platted road, a distance of 1320.27 feet to a point for the North corner of Lot 76, same being the West corner of Lot 77 of the B.C.I.C. Div. 8 subdivision, at position X=3154254.79 and Y=13555895.45;

THENCE South 47°08'13" East, coincident with the southwestern boundary line of Lot 77, same being the northeastern boundary line of Lot 76 of the B.C.I.C. Div. 8 subdivision, a distance of 660.00 feet to the **POINT OF BEGINNING**, at a 5/8" iron rod with survey cap marked "WPD 4467" set, from which a 5/8" iron rod bears South 37°54' West, a distance of 11.7 feet, for the common corner of Lot 54, Lot 55, Lot 76 and Lot 77 of the B.C.I.C. Div. 8 subdivision and the North corner of the herein described 5.0010 acre tract, at position X=3154738.50 and Y=13555446.53;

131 Commerce Street • Clute, Texas 77531-5601
Phone: 979-265-3622 • Fax: 979-265-9940 • Email: DW-Surveyor.com

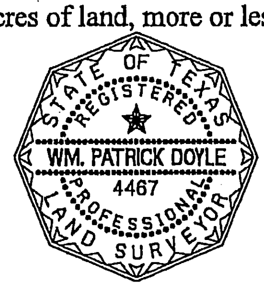
PARCEL No. 1, 5.0010 ACRE ENVIRONMENTAL MANAGEMENT TRACT
LOT 55 OF THE BRAZOS COAST INVESTMENT COMPANY SUBDIVISION, DIVISION 8
FREDERICK. J. CALVIT LEAGUE, ABSTRACT 51
BRAZORIA COUNTY, TEXAS

THENCE South 47°08'13" East, coincident with the southwestern boundary line of Lot 54, same being the northeastern boundary line of Lot 55 of the B.C.I.C. Div. 8 subdivision, at a distance of 640.00 feet pass a 5/8" iron rod with survey cap marked "WPD 4467" set in the apparent northwest right-of-way boundary line of the 80 foot wide Marlin Lane, known as Brazoria County Road #756, continuing a total distance of 660.00 feet to a point in the northwestern boundary line of a 40 foot wide platted roadway, at the South corner of Lot 54, same being the East corner of Lot 55 of the B.C.I.C. Div. 8 subdivision, from which an 1" iron pipe bears South 48°12' West, a distance of 1.6 feet, for the East corner of the herein described 5.0010 acre tract, at position X=3155222.22 and Y=13554997.62;

THENCE South 42°51'47" West, coincident with the northwestern right-of-way boundary line of said 40 foot wide platted road, same being the southeastern boundary line of Lot 55 of the B.C.I.C. Div. 8 subdivision, a distance of 330.07 feet to a point for the East corner of Lot 56, same being the South corner of Lot 55 of the B.C.I.C. Div. 8 subdivision, for the South corner of the herein described 5.0010 acre tract, at position X=3154997.71 and Y=13554755.72;

THENCE North 47°08'13" West, coincident with the northeastern boundary line of Lot 56, same being the southwestern boundary line of Lot 55, at a distance of 20.00 feet pass a 5/8" iron rod with survey cap marked "WPD 4467" set in the apparent northwest right-of-way boundary line of the 80 foot wide Marlin Lane, known as Brazoria County Road #756, continuing a total distance of 660.00 feet to a 5/8" iron rod with survey cap marked "WPD 4467" set at the common corner of Lot 55, Lot 56, Lot 75 and Lot 76 of the B.C.I.C. Div. 8 subdivision, for the West corner of the herein described 5.0010 acre tract, from which an iron rod with survey cap bears South 38°39' West, a distance of 11.8 feet, at position X=3154514.00 and Y=13555204.63;

THENCE North 42°51'47" East, coincident with the northwestern boundary line of Lot 55, same being the southeastern boundary line of Lot 76, a distance of 330.07 feet to the **POINT OF BEGINNING**, containing 5.0010 acres of land, more or less.



Wm. Patrick Doyle
Registered Professional Land Surveyor
Texas Registration Number 4467
March 24, 2009

This description is based on a survey, a plat of which, March 18, 2009 is on file in the office of Doyle & Wachtstetter, Inc.

Doyle & Wachtstetter, Inc
Surveying and Mapping • GPS/GIS

PARCEL No. 2, 5.0010 ACRE ENVIRONMENTAL MANAGEMENT TRACT
LOT 57 OF THE BRAZOS COAST INVESTMENT COMPANY SUBDIVISION, DIVISION 8
FREDERICK. J. CALVIT LEAGUE, ABSTRACT 51
BRAZORIA COUNTY, TEXAS

ALL THAT CERTAIN 5.0010 ACRE tract of land lying in and situated in the Frederick J. Calvit League, Abstract 51, Brazoria County, Texas, being all of Lot 57 of the Brazos Coast Investment Company Subdivision, Division 8 (B.C.I.C. Div. 8), according to the map or plat thereof recorded in Volume 2, Page 141 of the Brazoria County Plat Records (B.C.P.R.) and being the same tract of land conveyed by deed on August 6, 1999 from Janet Casciato-Northrup, Trustee of the Chapter 7 Bankruptcy Estate of Hercules Marine Services Corporation to LDL Coastal Limited, L.P., as recorded in Clerk's File No. 99-036339 of the Brazoria County Official Records (B.C.O.R.), the herein described tract of land being more particularly described by metes and bounds, using survey terminology which refers to the Texas State Plane Coordinate System, South Central Zone (NAD83), in which the directions are Lambert grid bearings and the distances are surface level horizontal lengths (S.F.= 0.99988752832) as follows

COMMENCING at a 3/4" iron rod found marking the North corner Lot 80, same being the West corner of Lot 81 of the aforementioned B.C.I.C. Div. 8 subdivision, located in the southeastern right-of-way boundary line of a 40 foot wide platted roadway of the said B.C.I.C. Div. 8 subdivision, said Point of Commencement being at Texas at State Plane Coordinate System position X=3155152.81 and Y=13556863.07, from which an old 3" x 3/4" hard-wood stake located in the southeastern right-of-way boundary line of a 40 foot wide platted roadway of the said B.C.I.C. Div. 8 subdivision, found marking the North corner of Lot 66, same being the and the West corner of Lot 67 bears South 42°51'47" West, a distance of 4620.94 feet (called 4620.00 feet), at Texas State Plane Coordinate System position X=3152009.76 and Y=13553476.39, herein located point of commencement and point of reference, being shown in 1952 Dow Chemical Company survey by Herman D. Smith, RPS #916, drawing number: B8-8-19000-10488;

THENCE South 42°51'47" West, coincident with the southeastern right-of-way boundary line of said 40 foot wide platted road, a distance of 1980.40 feet to a point for the North corner of Lot 74, same being the West corner of Lot 75 of the B.C.I.C. Div. 8 subdivision, at position X=3153805.79 and Y=13555411.64;

THENCE South 47°08'13" East, coincident with the southwestern boundary line of Lot 75, same being the northeastern boundary line of Lot 74 of the B.C.I.C. Div. 8 subdivision, a distance of 660.00 feet to the **POINT OF BEGINNING**, at a 5/8" iron rod with survey cap marked "WPD 4467" set for the common corner of Lot 56, Lot 57, Lot 74 and Lot 75 of the B.C.I.C. Div. 8 subdivision and the North corner of the herein described 5.0010 acre tract, at position X=3154289.50 and Y=13554962.72;

THENCE South 47°08'13" East, coincident with the southwestern boundary line of Lot 56, same being the northeastern boundary line of Lot 57 of the B.C.I.C. Div. 8 subdivision, at a distance of 640.00 feet pass a 5/8" iron rod with survey cap marked "WPD 4467" set in the apparent northwest right-of-way boundary line of the 80 foot wide Marlin Lane, known as Brazoria County Road #756, continuing a total distance of 660.00 feet to a point in the northwestern boundary line of a 40 foot wide platted roadway, at the South corner of Lot 56, same being the East corner of Lot 57 of the B.C.I.C. Div. 8 subdivision, for the East corner of the herein described 5.0010 acre tract, at position X=3154773.21 and Y=13554513.81;

THENCE South 42°51'47" West, coincident with the northwestern right-of-way boundary line of said 40 foot wide platted road, same being the southeastern boundary line of Lot 57 of the B.C.I.C. Div. 8 subdivision, a distance of 330.07 feet to a point for the East corner of Lot 58, same being the South corner of Lot 57 of the B.C.I.C. Div. 8 subdivision, for the South corner of the herein described 5.0010 acre tract, from which an iron rod with survey cap bears North 78°35' West, a distance of 22.4 feet, at position X=3154548.71 and Y=13554271.90;

THENCE North 47°08'13" West, coincident with the northeastern boundary line of Lot 58, same being the southwestern boundary line of Lot 57, at a distance of 20.00 feet pass a 5/8" iron rod with survey cap marked "WPD 4467" set in the apparent northwest right-of-way boundary line of the 80 foot wide Marlin Lane, known as Brazoria County Road #756, continuing a total distance of 660.00 feet to a 5/8" iron rod with survey cap marked "WPD 4467" set at the common corner of Lot 57, Lot 58, Lot 73 and Lot 74 of the B.C.I.C. Div. 8 subdivision, for the West corner of the herein described 5.0010 acre tract, from which an iron rod with survey cap bears South 38°39' West, a distance of 11.6 feet, at position X=3154065.00 and Y=13554720.82;

THENCE North 42°51'47" East, coincident with northwestern boundary line of Lot 57, same being the southeastern boundary line of Lot 74 of the B.C.I.C. Div. 8 subdivision, a distance of 330.07 feet to the **POINT OF BEGINNING**, containing 5.0010 acres of land, more or less.

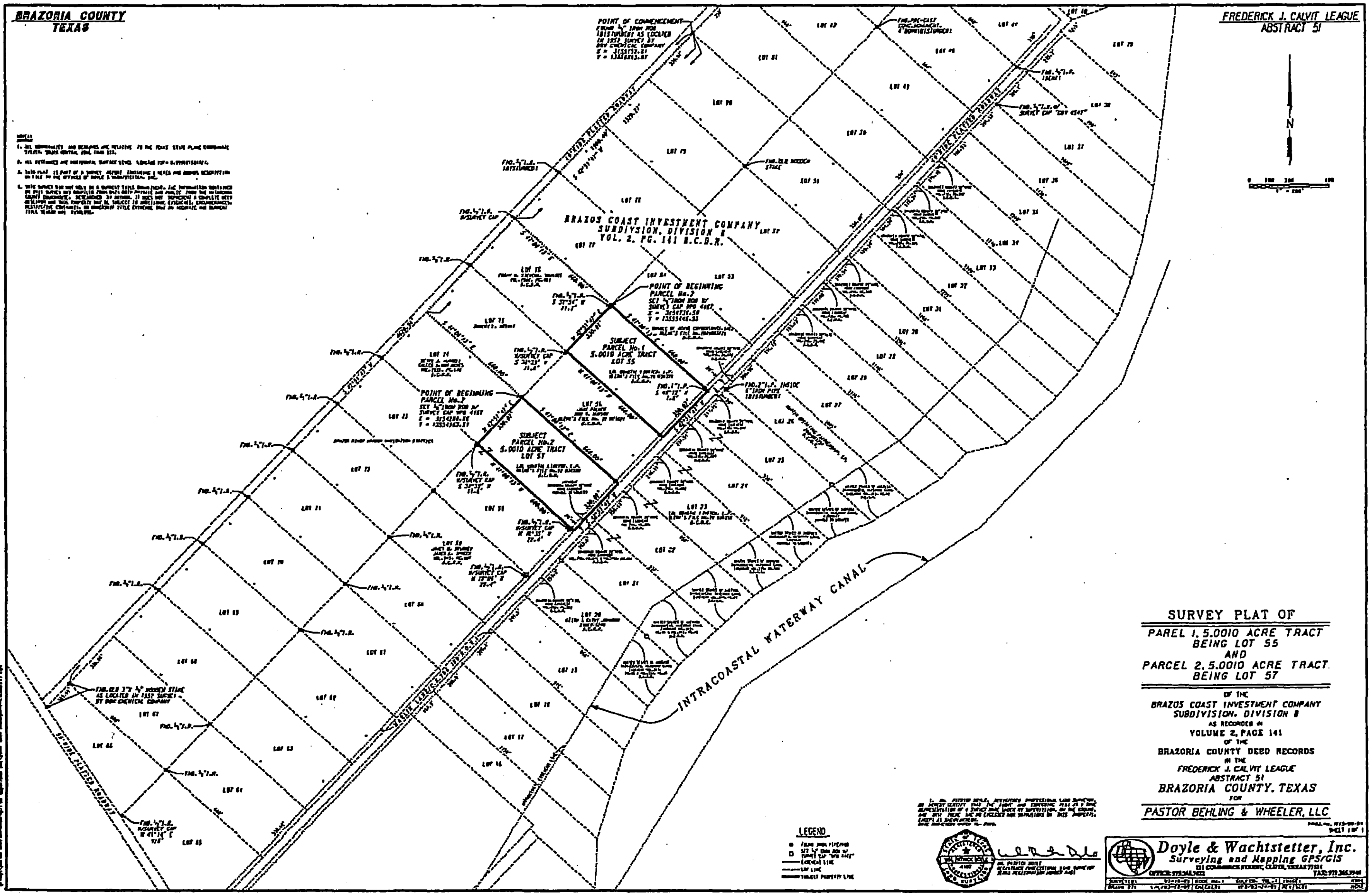
STATE OF TEXAS REGISTERED WM. PATRICK DOYLE 4467 PROFESSIONAL LAND SURVEYOR

Wm. Patrick Doyle
Registered Professional Land Surveyor
Texas Registration Number 4467
March 18, 2009

This description is based on a survey, a plat of which, February 17, 2009 is on file in the office of Doyle & Wachtstetter, Inc.
Legal\pat\Gulfco Lot57 Environmental Management 5.00 Acre Tract BCIC8.doc

Exhibit B

Plat Map of the Property – area covered by Restrictive Covenant for Limitation on Uses, Construction and Groundwater Use


BRAZORIA COUNTY
TEXAS
FREDERICK J. CALVIT LEAGUE
ABSTRACT 51
N
BRAZOS COAST INVESTMENT COMPANY
SUBDIVISION, DIVISION 8
VOL. 2, PG. 141 B.C.D.R.
POINT OF COMMENCEMENT
POINT OF BEGINNING
PARCEL No.2
SUBJECT
PARCEL No.1
5.0010 ACRE TRACT
LOT 55
SUBJECT
PARCEL No.2
5.0010 ACRE TRACT
LOT 57
INTRACOASTAL WATERWAY CANAL
LEGEND
SURVEY PLAT OF
PAREL 1. 5.0010 ACRE TRACT
BEING LOT 55
AND
PARCEL 2. 5.0010 ACRE TRACT
BEING LOT 57
OF THE
BRAZOS COAST INVESTMENT COMPANY
SUBDIVISION. DIVISION 8
AS RECORDED IN
VOLUME 2, PAGE 141
OF THE
BRAZORIA COUNTY DEED RECORDS
IN THE
FREDERICK J. CALVIT LEAGUE
ABSTRACT 51
BRAZORIA COUNTY, TEXAS
FOR
PASTOR BEHLING & WHEELER, LLC
Doyle & Wachtstetter, Inc.
Surveying and Mapping GPS/GIS

RESTRICTIVE COVENANT FOR LIMITATION ON USES AND GROUNDWATER USE

STATE OF TEXAS §
§
COUNTY OF BRAZORIA §

Doc# 2009036114

11N

This Restrictive Covenant is filed to provide information concerning certain environmental conditions and use limitations upon that parcel of real property (the "Property") described in Exhibits A and B, attached hereto and incorporated herein by reference, and which at the time of this filing is listed on the United States Environmental Protection Agency's ("EPA") National Priority List as a "Superfund Site."

As of the date of this Restrictive Covenant, the record owner of fee title to the Property is **LDL COASTAL LIMITED, L.P.**, a Texas limited partnership ("Owner"), with an address of c/o Allen Daniels, 6363 Woodway Drive, Suite 730, Houston, Texas 77057. The appropriate land use for the Property is commercial/industrial.

LDL Coastal Limited, L.P. has agreed to place the following restrictions on the Property in favor of The Dow Chemical Company ("Dow"), Chromalloy American Corporation ("Chromalloy"), the Texas Commission on Environmental Quality ("TCEQ"), the State of Texas and EPA.

NOW THEREFORE, in consideration of the premises and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the following restrictive covenants in favor of Dow, Chromalloy, TCEQ, the State of Texas and EPA are placed on the Property, to-wit:

1. Commercial/Industrial Use.

The Property shall not be used for any purposes other than commercial/industrial uses, as that term is defined under 30 T.A.C §350.4(a)(13), and thus shall not be used for human habitation or for other purposes with a similar potential for human exposure. Portions of the soils and/or groundwater of the Property contain certain identified chemicals of concern. Future users of the Property are advised to review and take into consideration environmental data from publicly available sources (i.e. TCEQ and EPA) prior to utilizing the Property for any purpose.

2. Groundwater.

The groundwater underlying the Property shall not be used for any beneficial purpose, including: (1) drinking water or other potable uses; (2) the irrigation or watering of landscapes or (3) agricultural uses. For any activities that may result in potential exposure to the groundwater, a plan must be in place to address and ensure the appropriate handling, treatment and disposal of any affected soils or groundwater.

3. These restrictions shall be a covenant running with the land.

For additional information, contact:

The Dow Chemical Company
2030 Dow Center
8th Floor Legal Dept.
Midland, MI 48674
ATTN: General Counsel

Chromalloy American Corporation
C/O Sequa Corporation
200 Park Avenue
New York, NY 10166
ATTN: General Counsel

U.S. Environmental Protection Agency, Region 6
Superfund Division (6RC-S)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733
ATTN: Assistant Regional Counsel

Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087
ATTN: Remediation Division

State of Texas
Office of the Texas Attorney General
Natural Resources Division
300 W. 15th Street
Austin, TX 78701

The restrictions imposed by this Restrictive Covenant may be rendered of no further force or effect only by a release executed by Dow, Chromalloy, TCEQ, the State of Texas and EPA or their successors and filed in the same Real Property Records as those in which this Restrictive Covenant is filed.

Executed this 28th day of July, 2009.

OWNER: LDL COASTAL LIMITED, L.P., a Texas limited partnership

By: RAMWAY Management, L.L.C., a Texas limited liability company, its sole general partner

By: ______________________

Name: Allen B. Daniels

Title: Manager

STATE OF TEXAS §

§

COUNTY OF Travis §

BEFORE ME, on this the 28 day of July, 2009, personally appeared Allen B. Daniels, Manager, of RAMWAY Management, L.L.C., a Texas limited liability company and the sole general partner of LDL Coastal Limited, L.P., a Texas limited partnership, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and in the capacity herein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 28 day of July, 2009.

NOTARY PUBLIC STATE OF TEXAS
Meredith Anne Moran
My Commission Expires
12/13/2011

Meredith Anne Moran

Notary Public in and for the State of Texas

My Commission Expires: 12/13/2011

2662308.1/SP/73364/0238/052909

Exhibit A

Legal Description of the Property

Doyle & Wachtstetter, Inc
Surveying and Mapping • GPS/GIS

PARCEL No. 1, 5.0010 ACRE ENVIRONMENTAL MANAGEMENT TRACT
LOT 58 OF THE BRAZOS COAST INVESTMENT COMPANY SUBDIVISION, DIVISION 8
FREDERICK. J. CALVIT LEAGUE, ABSTRACT 51
BRAZORIA COUNTY, TEXAS

ALL THAT CERTAIN 5.0010 ACRE tract of land lying in and situated in the Frederick J. Calvit League, Abstract 51, Brazoria County, Texas, being all of Lot 58 of the Brazos Coast Investment Company Subdivision, Division 8 (B.C.I.C. Div. 8), according to the map or plat thereof recorded in Volume 2, Page 141 of the Brazoria County Plat Records (B.C.P.R.) and being the same tract of land conveyed by deed on August 6, 1999 from Janet Casciato-Northrup, Trustee of the Chapter 7 Bankruptcy Estate of Hercules Marine Services Corporation to LDL Coastal Limited, L.P., as recorded in Clerk's File No. 99-036339 of the Brazoria County Official Records (B.C.O.R.), the herein described tract of land being more particularly described by metes and bounds, using survey terminology which refers to the Texas State Plane Coordinate System, South Central Zone (NAD83), in which the directions are Lambert grid bearings and the distances are surface level horizontal lengths (S.F.= 0.99988752832) as follows

COMMENCING at a 3/4" iron rod found marking the North corner Lot 80, same being the West corner of Lot 81 of the aforementioned B.C.I.C. Div. 8 subdivision, located in the southeastern right-of-way boundary line of a 40 foot wide platted roadway of the said B.C.I.C. Div. 8 subdivision, said Point of Commencement being at Texas at State Plane Coordinate System position X=3155152.81 and Y=13556863.07, from which an old 3" x 3/4" hard-wood stake located in the southeastern right-of-way boundary line of a 40 foot wide platted roadway of the said B.C.I.C. Div. 8 subdivision, found marking the North corner of Lot 66, same being the and the West corner of Lot 67 bears South 42°51'47" West, a distance of 4620.94 feet (called 4620.00 feet), at Texas State Plane Coordinate System position X=3152009.76 and Y=13553476.39, herein located point of commencement and point of reference, being shown in 1952 Dow Chemical Company survey by Herman D. Smith, RPS #916, drawing number: B8-8-19000-10488;

THENCE South 42°51'47" West, coincident with the southeastern right-of-way boundary line of said 40 foot wide platted roadway, a distance of 2310.47 feet to a point for the North corner of Lot 73, same being the West corner of Lot 74 of the said B.C.I.C. Div. 8 subdivision, at position X=3153581.28 and Y=13555169.73;

THENCE South 47°08'13" East, coincident with the southwestern boundary line of Lot 74, same being the northeastern boundary line of Lot 73 of the said B.C.I.C. Div. 8 subdivision, a distance of 660.00 feet to the **POINT OF BEGINNING**, at a 5/8" iron rod with survey cap marked "WPD 4467" set, from which an iron rod with survey cap bears South 38°39' West, a distance of 11.6 feet, for the common corner of Lot 57, Lot 58, Lot 73 and Lot 74 of the B.C.I.C. Div. 8 subdivision and the North corner of the herein described 5.0010 acre tract, at position X=3154065.00 and Y=13554720.82;

PARCEL No. 1, 5.0010 ACRE ENVIRONMENTAL MANAGEMENT TRACT
LOT 58 OF THE BRAZOS COAST INVESTMENT COMPANY SUBDIVISION, DIVISION 8
FREDERICK. J. CALVIT LEAGUE, ABSTRACT 51
BRAZORIA COUNTY, TEXAS

THENCE South 47°08'13" East, coincident with the southwestern boundary line of Lot 57, same being the northeastern boundary line of Lot 58 of the B.C.I.C. Div. 8 subdivision, at a distance of 640.00 feet pass a 5/8" iron rod with survey cap marked "WPD 4467" set in the apparent northwest right-of-way boundary line of the 80 foot wide Marlin Lane, known as Brazoria County Road #756, continuing a total distance of 660.00 feet to a point in the northwestern boundary line of a 40 foot wide platted roadway, at the South corner of Lot 57, same being the East corner of Lot 58 of the B.C.I.C. Div. 8 subdivision, from which an iron rod with survey cap bears North 78°35' West, a distance of 22.4 feet, for the East corner of the herein described 5.0010 acre tract, at position X=3154548.71 and Y=13554271.90;

THENCE South 42°51'47" West, coincident with the northwestern right-of-way boundary line of said 40 foot wide platted road, same being the southeastern boundary line of Lot 58 of the B.C.I.C. Div. 8 subdivision, a distance of 330.07 feet to a point for the East corner of Lot 59, same being the South corner of Lot 58 of the B.C.I.C. Div. 8 subdivision, from which an iron rod with cap bears North 78°08' West, a distance of 22.4 feet, for the South corner of the herein described 5.0010 acre tract, at position X=3154324.20 and Y=13554030.00;

THENCE North 47°08'13" West, coincident with the northeastern boundary line of Lot 59, same being the southwestern boundary line of Lot 58, at a distance of 20.00 feet pass a 5/8" iron rod with survey cap marked "WPD 4467" set in the apparent northwest right-of-way boundary line of the 80 foot wide Marlin Lane, known as Brazoria County Road #756, continuing a total distance of 660.00 feet to a 5/8" iron rod with survey cap marked "WPD 4467" set at the common corner of Lot 58, Lot 59, Lot 72 and Lot 73 of the B.C.I.C. Div. 8 subdivision, for the West corner of the herein described 5.0010 acre tract, at position X=3153840.49 and Y=13554478.91;

THENCE North 42°51'47" East, coincident with the northwest boundary line of Lot 58, same being the southeastern boundary line of Lot 73 of the B.C.I.C. Div. 8 subdivision, a distance of 330.07 feet to the **POINT OF BEGINNING**, containing 5.0010 acres of land, more or less.

STATE OF TEXAS
REGISTERED
WM. PATRICK DOYLE
4467
PROFESSIONAL
LAND SURVEYOR

Wm. Patrick Doyle
Registered Professional Land Surveyor
Texas Registration Number 4467
March 23, 2009

This description is based on a survey, a plat of which, March 18, 2009 is on file in the office of Doyle & Wachtstetter, Inc.
Legal\pat\ Gulfco Lot 58 Environmental Management 5.00 Acre Tract BCIC8.doc

Doyle & Wachtstetter, Inc
Surveying and Mapping • GPS/GIS

PARCEL No. 2, 24.7552 ACRE ENVIRONMENTAL MANAGEMENT TRACT
ALL OF LOT 21 THROUGH LOT 25 OF THE
BRAZOS COAST INVESTMENT COMPANY SUBDIVISION, DIVISION 8
FREDERICK. J. CALVIT LEAGUE, ABSTRACT 51
BRAZORIA COUNTY, TEXAS

ALL THAT CERTAIN 24.7552 ACRE tract of land lying in and situated in the Frederick J. Calvit League, Abstract 51, Brazoria County, Texas, being all of Lots 21, 22, 23, 24 and 25 of the Brazos Coast Investment Company Subdivision, Division 8 (B.C.I.C. Div. 8), according to the map or plat thereof recorded in Volume 2, Page 141 of the Brazoria County Plat Records (B.C.P.R.) and being the same tract of land conveyed by deed on August 6, 1999 from Janet Casciato-Northrup, Trustee of the Chapter 7 Bankruptcy Estate of Hercules Marine Services Corporation to LDL Coastal Limited, L.P., as recorded in Clerk's File No. 99-036339 of the Brazoria County Official Records (B.C.O.R.), the herein described tract of land being more particularly described by metes and bounds, using survey terminology which refers to the Texas State Plane Coordinate System, South Central Zone (NAD83), in which the directions are Lambert grid bearings and the distances are surface level horizontal lengths (S.F.= 0.99988752832) as follows:

COMMENCING at a 3/4" iron rod found marking the North corner Lot 80, same being the West corner of Lot 81 of the aforementioned B.C.I.C. Div. 8 subdivision, located in the southeastern right-of-way boundary line of a 40 foot wide platted roadway of the said B.C.I.C. Div. 8 subdivision, said Point of Commencement being at Texas at State Plane Coordinate System position X=3155152.81 and Y=13556863.07, from which an old 3" x 3/4" hard-wood stake located in the southeastern right-of-way boundary line of a 40 foot wide platted roadway of the said B.C.I.C. Div. 8 subdivision, found marking the North corner of Lot 66, same being the and the West corner of Lot 67 bears South 42°51'47" West, a distance of 4620.94 feet (called 4620.00 feet), at Texas State Plane Coordinate System position X=3152009.76 and Y=13553476.39, herein located point of commencement and point of reference, being shown in 1952 Dow Chemical Company survey by Herman D. Smith, RPS #916, drawing number: B8-8-19000-10488;

THENCE South 47°08'13" East, a distance of 1360.00 feet to a point for corner, located in the northwestern boundary line of Lot 32 of the B.C.I.C. Div. 8 subdivision, same being the southeastern right-of-way boundary line of a 40 foot wide platted roadway, at position X=3156149.54 and Y=13555938.04;

THENCE South 42°51'47" West, coincident with the northwestern boundary line of Lot 26 through Lot 32 of the B.C.I.C. Div. 8 subdivision, same being the southeastern right-of-way boundary line of said 40 foot wide platted road, a distance of 1250.83 feet to the **POINT OF BEGINNING** of the description, from which a 2" iron pipe inside a 6" iron pipe found disturbed bears South 44°30' East, a distance of 20.7 feet, said point being the West corner of Lot 26, same being the North corner of Lot 25 of the B.C.I.C. Div. 8 subdivision and the herein described 24.7552 acre tract, at position X=3155298.76 and Y=13555021.31;

PARCEL No. 2, 24.7552 ACRE ENVIRONMENTAL MANAGEMENT TRACT
ALL OF LOT 21 THROUGH LOT 25 OF THE
BRAZOS COAST INVESTMENT COMPANY SUBDIVISION, DIVISION 8
FREDERICK. J. CALVIT LEAGUE, ABSTRACT 51
BRAZORIA COUNTY, TEXAS

THENCE South 47°08'13" East, coincident with the northeastern boundary line of Lot 25, same being the southwestern boundary line of Lot 26 of the B.C.I.C. Div. 8 subdivision, at a distance of 20.00 feet pass a 5/8" iron rod with survey cap marked "WPD 4467" set in the southeastern right-of-way boundary line of the 80 foot wide Marlin Lane, known as Brazoria County Road #756 and being the East corner of all that certain 20 foot wide road easement conveyed by deed on August 15, 1961 from Joe M. Baggett, et al to Brazoria County, as recorded in Volume 798, Page 674 of the Brazoria County Deed Records (B.C.D.R.), at a distance of 730.00 feet pass a 5/8" iron rod with survey cap marked "WPD 4467" set for reference corner, continuing for a total distance of 1030.00 feet to a point, at the South corner of said Lot 26, East corner of said Lot 25 and the East corner of the United States of America Intracoastal Waterway easement, for the East corner of the herein described 24.7552 acre tract, at position X=3156053.65 and Y=13554320.73;

THENCE South 67°31'58" West, with the southeastern boundary line of said Lot 25 and said United States of America Intracoastal Waterway easement, a distance of 239.59 feet to the South corner of said Lot 25, same being the East corner of said Lot 24, for an angle corner of the herein described 24.7552 acre tract, at position X=3155832.27 and Y=13554229.18;

THENCE South 47°18'32" West, with the southeastern boundary line of said Lot 24 and said United States of America Intracoastal Waterway easement, a distance of 232.21 feet to the South corner of said Lot 24, same being the East corner of said Lot 23, for an angle corner of the herein described 24.7552 acre tract, at position X=3155661.61 and Y=13554071.75;

THENCE South 56°59'51" West, with the southeastern boundary line of said Lot 23 and said United States of America Intracoastal Waterway easement, a distance of 253.89 feet to the South corner of said Lot 23, same being the East corner of said Lot 22, for an angle corner of the herein described 24.7552 acre tract, at position X=3155448.71 and Y=13553933.48;

THENCE South 45°45'48" West, with the southeastern boundary line of said Lot 22 and the said United States of America Intracoastal Waterway easement, a distance of 256.93 feet to the south corner of said Lot 22, same being the East corner of said Lot 21, for an angle corner of the herein described 24.7552 acre tract, at position X=3155264.64 and Y=13553754.25;

THENCE South 46°33'11" West, with the southeastern boundary line of said Lot 21 and the said United States of America Intracoastal Waterway easement, a distance of 264.15 feet to the East corner of Lot 20, same being the South corner of said Lot 21 of the B.C.I.C. Div. 8 subdivision and the South corner of the herein described 24.7552 acre tract, at position X=3155072.89 and Y=13553572.62;

PARCEL No. 2, 24.7552 ACRE ENVIRONMENTAL MANAGEMENT TRACT
ALL OF LOT 21 THROUGH LOT 25 OF THE
BRAZOS COAST INVESTMENT COMPANY SUBDIVISION, DIVISION 8
FREDERICK. J. CALVIT LEAGUE, ABSTRACT 51
BRAZORIA COUNTY, TEXAS

THENCE North 47°08'13" West, coincident with the southwestern boundary line of Lot 21, same being the northeastern boundary line of Lot 20, at a distance of 220.00 feet pass a 5/8" iron rod with survey cap marked "WPD 4467" set for reference corner, at a distance of 800.00 feet pass a 5/8" iron rod with survey cap marked "WPD 4467" set in the southeastern right-of-way boundary line of the 80 foot wide Marlin Lane, known as Brazoria County Road #756 and the South corner of the of a 20 foot wide roadway easement conveyed on August 15, 1961 from R. F. Dwyer, III to Brazoria County, as recorded in Volume 798, Page 679 of the B.C.D.R., continuing for a total distance of 820.00 feet to a point for corner in the southeast right-of-way boundary line of said 40 foot wide platted roadway, at the North corner of Lot 20, West corner of Lot 21 and the West corner of the herein described 24.7552 acre tract, at position X=3154471.91 and Y=13554130.36;

THENCE North 42°51'47" East, coincident with the northwestern boundary line of Lot 21 through Lot 25 of the B.C.I.C. Div. 8 subdivision, same being the southeastern right-of-way boundary line of said 40 foot wide platted road, a distance of 1215.65 feet to the **POINT OF BEGINNING,** containing 24.7552 acres of land, more or less.

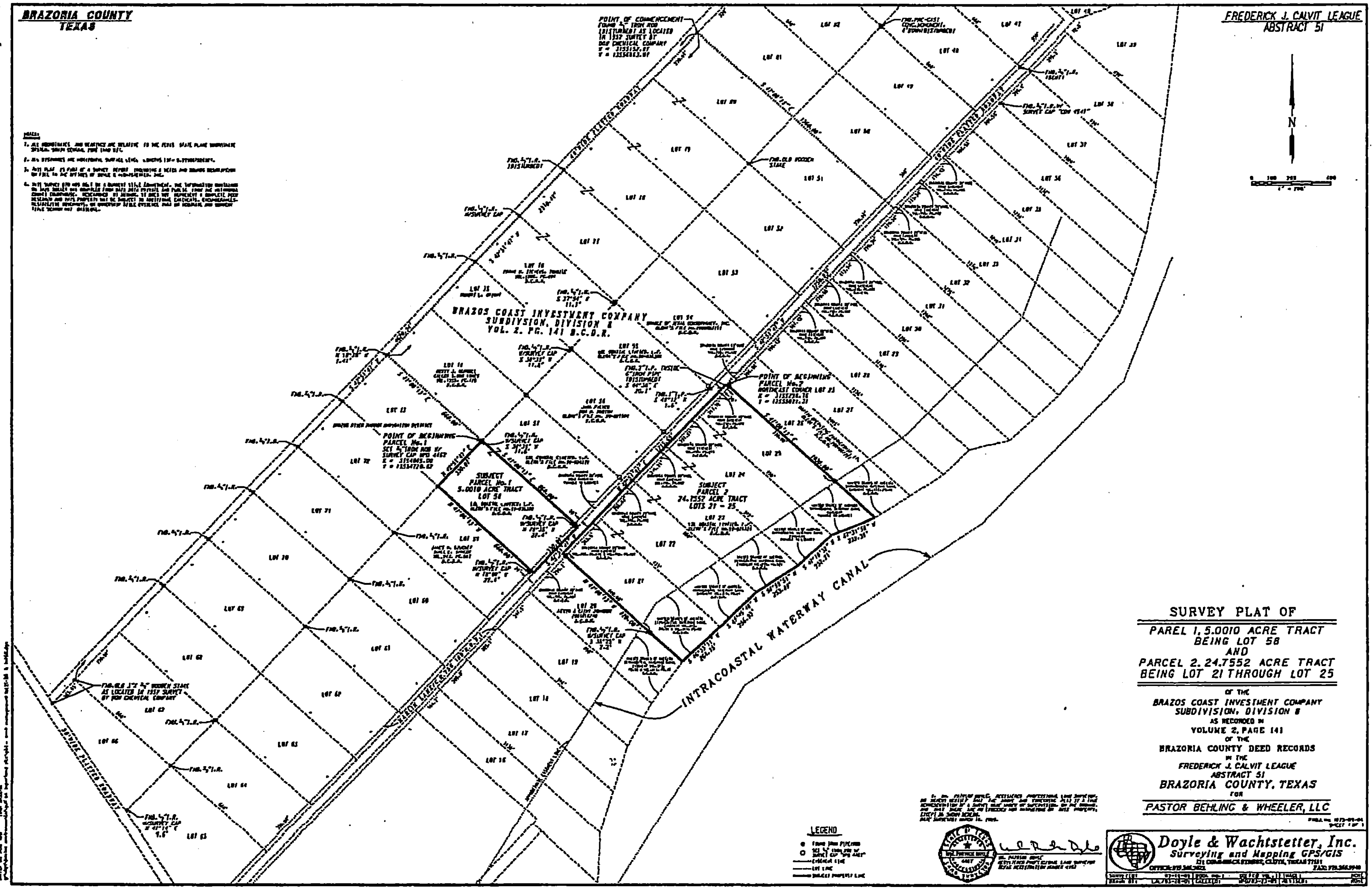
STATE OF TEXAS
REGISTERED
WM. PATRICK DOYLE
4467
PROFESSIONAL
LAND SURVEYOR

Wm. Patrick Doyle
Registered Professional Land Surveyor
Texas Registration Number 4467
March 23, 2009

This description is based on a survey, a plat of which, March 18, 2009 is on file in the office of Doyle & Wachtstetter, Inc.
Legal\pat\Pastor Behling & Wheeler\ Gulfco Superfund Lot21 through Lot25 Environmental Management 24.7552 Acre Tract BCIC#8.doc

Exhibit B

Plat Map of the Property – area covered by Restrictive Covenant for Limitation on Uses and Groundwater Use


BRAZORIA COUNTY
TEXAS
FREDERICK J. CALVIT LEAGUE
ABSTRACT 51
N
BRAZOS COAST INVESTMENT COMPANY
SUBDIVISION, DIVISION 8
VOL. 2, PG. 141 B.C.D.R.
SUBJECT
PARCEL No. 1
5.0010 ACRE TRACT
LOT 58
SUBJECT
PARCEL 2
24.7552 ACRE TRACT
LOTS 21 - 25
POINT OF BEGINNING
PARCEL No. 1
POINT OF BEGINNING
PARCEL No. 2
POINT OF COMMENCEMENT
INTRACOASTAL WATERWAY CANAL
LEGEND
SURVEY PLAT OF
PAREL 1, 5.0010 ACRE TRACT
BEING LOT 58
AND
PARCEL 2. 24.7552 ACRE TRACT
BEING LOT 21 THROUGH LOT 25
OF THE
BRAZOS COAST INVESTMENT COMPANY
SUBDIVISION, DIVISION 8
AS RECORDED IN
VOLUME 2, PAGE 141
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BRAZORIA COUNTY DEED RECORDS
IN THE
FREDERICK J. CALVIT LEAGUE
ABSTRACT 51
BRAZORIA COUNTY, TEXAS
FOR
PASTOR BEHLING & WHEELER, LLC
Doyle & Wachtstetter, Inc.
Surveying and Mapping GPS/GIS

Doc# 2009036114
Pages 11
08/13/2009 1:44PM
Official Public Records of
BRAZORIA COUNTY
JOYCE HUDMAN
COUNTY CLERK
Fees $56.00

Joyce Hudman